

SDMS Document



123086

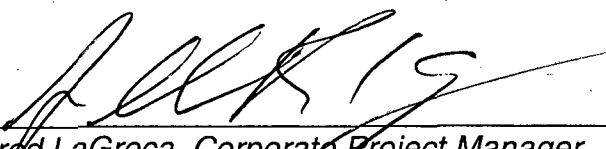
**Sevenson
Environmental
Services, Inc.**

**Cornell-Dubilier Electronics Superfund Site
Operable Unit 02**

South Plainfield, New Jersey

Site Safety and Health Plan Approvals

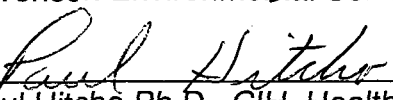
Revision 1 December 5 2006



Alfred LaGreca, Corporate Project Manager
Sevenson Environmental Services, Inc.

12-6-06


Date



Paul Hitcho Ph.D., CIH, Health and Safety Manager
Sevenson Environmental Services, Inc.

12-6-06

Date



Kim Lickfield, Project Manager
Sevenson Environmental Services, Inc.

12-6-06

Date



Sam Tavelaris, Site Safety and Health Officer
Sevenson Environmental Services, Inc.

12-6-06

Date

1.0 INTRODUCTION	8
1.1 Plan Objective	8
1.2 Safety and Health Policy Statement	8
1.3 Drug and Alcohol Policy	9
1.4 Project Safety and Health Expectations	9
1.5 Project Safety and Health Compliance Program	9
1.6 Project Safety Incentive Program	10
1.7 References	10
1.8 Site Safety and Health Plan Revisions	11
1.9 Site Information	11
2.0 ORGANIZATION AND RESPONSIBILITIES	14
2.1 Corporate Project Manager	14
2.2 Project Manager	14
2.3 Project Superintendent	14
2.4 Safety and Health Manager (SHM)	15
2.5 Certified Industrial Hygienist (CIH)	15
2.6 Occupational Physician	15
2.7 Site Safety and Health Officer (SSHO)	16
2.8 Subcontractors	16
3.0 HAZARD/RISK ANALYSIS	19
3.1 Site Tasks and Operations	19
3.2 Hazards	19
3.2.1 Safety/Physical Hazards	19
3.2.1.1 Electrical	20
3.2.1.2 Heavy Equipment/Vehicle Traffic	21
3.2.1.3 Material Handling	21
3.2.1.4 Hand and Power Tools	22
3.2.1.5 Noise Exposure	22
3.2.1.6 Excavation/Trenching Hazards	23
3.2.1.7 Slip/Trip/Fall	24
3.2.1.8 Heat Stress	24
3.2.1.9 Cold Stress	26
3.2.1.10 Fires/Explosions Hazard	28
3.2.1.11 Oxygen Deficiency	28
3.2.1.12 Building/Structure Demolition	29
3.2.1.13 Fall From Elevation	29
3.2.2 Chemical Hazards	29
3.2.3 Biological Hazards	30
3.2.3.1 Needlestick Injuries	30
3.2.3.2 Ticks	30
3.2.3.3 Rodents and Wildlife	31
3.2.3.3 Poisonous Plants	31

3.2.3.4 Snakes	31
3.2.3.5 Flying Insects	31
3.2.3.6 Spiders	32
3.3 Engineering Controls	32
3.3.1 Dust Control	32
3.3.2 Off-site Tracking of Contamination	32
3.3.3 Noise Control	33
4.0 SAFETY AND HEALTH TRAINING	33
4.1 General Hazardous Waste Operation Training	33
4.2 Preparatory Meetings	33
4.3 Site-Specific Training	33
4.3.1 Initial Session	34
4.3.2 Periodic Sessions	34
4.4 Safety Meetings	35
4.5 Hazard Communication Training	35
4.6 Excavation/Trenching Competent Person	35
4.7 First Aid/CPR Training	35
5.0 MEDICAL SURVEILLANCE PROGRAM	35
5.1 Baseline Medical Monitoring	36
5.2 Periodic Monitoring	36
5.3 Exposure/Injury/Medical Support	37
5.4 Medical Records	37
6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)	37
6.1 PPE Hazard Assessment	38
6.1.1 Head Protection	39
6.1.2 Hand Protection	39
6.1.3 Eye/Face Protection	39
6.1.4 Footwear	39
6.1.5 Respiratory Protection	39
6.2 Levels of Protection	41
6.2.1 Level B	41
6.2.2 Level C	41
6.2.3 Modified Level D	41
6.2.4 Level D	42
6.3 Initial Levels of Protection	42
7.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM	43
7.1 Real-Time Air Monitoring	43
7.1.1 Organic Vapor Monitoring	43
7.1.2 Combustible Gases/Carbon Monoxide/Oxygen Levels/Hydrogen Sulfide	44
7.1.3 Particulate Monitoring	44
7.2 Personal Air Sampling	44
7.3 Perimeter Air Monitoring	45
7.4 Operational Action Levels	45

8.0 ACCIDENT PREVENTION PROCEDURES/PRACTICES.....	46
8.1 Medical and First Aid Requirements	46
8.2 Hazardous Substances.....	47
8.3 Fall Protection	47
8.4 Electrical.....	48
8.5 Lockout and Tagout	50
8.6 Scaffolds.....	51
8.7 Motor Vehicles and Mechanized Equipment.....	53
8.8 Hand and Power Tools	54
8.9 Fire Protection and Prevention	57
8.10 Sanitation	58
8.11 Confined Space Entry	58
8.12 Welding and Cutting	59
8.13 Floor and Wall Openings	61
8.14 Trenching and Excavations	61
8.15 Stairways and Ladders	63
8.16 Materials Handling, Storage, Use, and Disposal.....	64
8.17 Signs, Signals, and Barricades	65
8.18 Cranes and Hoists.....	66
8.19 Demolition	67
8.20 Housekeeping.....	68
8.21 Asbestos Abatement.....	68
9.0 SITE CONTROL MEASURES.....	69
9.1 Work Zones.....	69
9.1.1 Exclusion Zone (EZ)	69
9.1.2 Contamination Reduction Zone (CRZ)	69
9.1.3 Support Zone	70
9.2 Site Entry and Exit Control Log.....	70
10.0 PERSONAL HYGIENE AND DECONTAMINATION.....	70
10.1 Personal Decontamination	71
10.2 Respirator Decontamination	71
10.3 Equipment Decontamination.....	72
10.4 Decontamination Log.....	72
10.5 Decontamination Residue	72
10.6 Personal Hygiene and Sanitation.....	72
11.0 EMERGENCY CONTINGENCY PLAN.....	73
11.1 Pre-Emergency Planning.....	73
11.2 Personnel Responsibilities	73
11.3 Evacuation Routes and Procedures	74
11.4 Emergency Decontamination Procedures	74
11.5 Medical Treatment/First Aid.....	75
11.6 Emergency Alarms/Notifications and Procedures	75
11.7 Implementation of the Plan	78
11.7.1 Conditions for Implementation.....	79

11.7.1.1 Fire or Explosion	79
11.7.1.2 Material Spills.....	79
11.7.1.3 Severe Weather	80
11.7.2 Initial Action.....	80
11.7.3 Corrective Action	80
11.7.4 Follow-through.....	80
11.8 Spill Response and Control Plan.....	80
11.8.1 Prevention.....	81
11.8.2 Reporting.....	81
11.8.3 Spill Response Equipment.....	82
11.8.4 Confinement and Containment.....	82
11.8.5 Cleanup.....	82
11.9 Report/Review	83
12.0 INSPECTION AND REPORTING.....	83
12.1 Safety and Health Inspections	83
12.2 Daily Safety and Inspections Log.....	84
12.3 Certification of Worker/Visitor Acknowledgment	84
12.4 Incident Reports	84
12.5 Daily Air Monitoring Report	84
12.6 Weekly Safety Meeting/Daily Tool Box Talks.....	85
12.7 Monthly Exposure Report.....	85
12.8 Safety and Health Phase-Out Report.....	85

FIGURES

Figure 1 – Site Map.....	13
Figure 2 – Organizational Chart.....	18
Figure 3 – Route to Hospital Map.....	96

TABLES

<i>Table 1 – Minimum Clearance From Energized Overhead Electrical Lines</i>	<i>20</i>
<i>Table 2 - Frequency of Physiological Monitoring</i>	<i>24</i>
<i>Table 3 - Wind Chill Index.....</i>	<i>26</i>
<i>Table 4 – Maximum Daily Time Limits for Exposure at Low Temperatures</i>	<i>27</i>
<i>Table 5 - Work/Warm-up Schedule.....</i>	<i>27</i>
<i>Table 6 - Initial Levels of Protection.....</i>	<i>42</i>
<i>Table 7- Personal Air Sampling</i>	<i>45</i>
<i>Table 8 - Operational Action Levels.....</i>	<i>45</i>
<i>Table 9 – Emergency Phone List</i>	<i>84</i>

ATTACHMENTS

<i>Attachment 1 – Activity Hazard Analysis</i>
<i>Attachment 2 – Chemical Information Sheets</i>
<i>Attachment 3 – Safety and Health Forms</i>

Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists'
ACM	Asbestos Containing Material
AHA	Activity Hazard Analysis
AIDS	Acquired Immune Deficiency Syndrome
ANSI	American National Standards Institute
CBC	Complete Blood Count
CFR	Code of Federal Regulation
CIH	Certified Industrial Hygienist
cm	Centimeter
CO	Carbon Monoxide
CPC	Chemical Protective Clothing
CPR	Cardiopulmonary resuscitation
dB(A)	Decibels A level
DEET	N-Diethyl-m-toluamide
DOT MUTCD	Department of Transportation Manual on Uniform Traffic Control Devices
ECL	Effluent Control Limit
EM	Engineering Manual
EMS	Emergency Medical Service
ER	Engineering Requirements
FEV1	Forced Expiratory Volume in 1 second
FVC	Forced Vital Capacity
GFCI	Ground Fault Circuit Interrupter
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HIV	Human Immunodeficiency Virus
HPS	Hanta Virus Pulmonary Syndrome
HTRW	Hazardous, Toxic and Radioactive Wastes
IDLH	Immediately Dangerous to Life and Health
lb	Pound
LEL	Lower Explosive Limit
m	Meter
MSDS	Material Safety Data Sheets
ml	Milliliter
mph	Miles per hour
MUTCD	Manual on Uniform Traffic Control Devices
NICA	Non-compliance Identification/Corrective Action
NIOSH	National Institute for Occupational Safety and Health
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
O ₂	Oxygen gas
PCB	Polychlorinated biphenyls
PEL	Permissible Exposure Limit
PID	Photo Ionization Detector

PPE	Personal Protective Equipment
PRAC	Pre-placed Remedial Action Contract
PVC	Poly vinyl chloride
ROPS	Roll Over Protective Structure
SAF	Self Absorption Factor
SCBA	Self Contained Breathing Apparatus
SHM	Safety and Health Manager
SMAC 24	Blood tests that gives your doctor important information about the current status of your kidneys, liver, and electrolyte and acid/base balance as well as of your blood sugar and blood proteins.
SOPs	Standard Operating Procedures
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SVOC	Semi Volatile Organic Compounds
TBD	To Be Determined
TWA	Time Weighted Average
UFPO	Underground Facilities Protection Organization
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEPA or EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

Sevenson Environmental Services, Inc., is under contract to the US Army Corps of Engineers (USACE), Kansas City District Pre-Placed Remedial Contract (PRAC), to perform remedial action at the Cornell-Dubilier Electronics Superfund Site, South Plainfield, New Jersey.

The remedial action effort will focus on the remediation of the Cornell-Dubilier Electronics Superfund Site, Operable Unit 02 (OU-2), in the Borough of South Plainfield, Middlesex County, New Jersey. OU-2 consists of contaminated facility site soils and buildings. Work includes demolition of structures; transportation of all waste and offsite disposal of all waste including demolition debris and soil resulting from demolition; restoration with backfill and pavement; sampling and analysis of soil, water air, and building material; and other activities necessary for complete and proper remediation of the site.

1.1 Plan Objective

The objective of this Site Safety and Health Plan (SSHP) is to define the requirements and designate protocols to be followed during remedial action at the Cornell-Dubilier Project. Applicability extends to Sevenson personnel, Sevenson's subcontractors, and visitors inclusive of USACE personnel and representatives, engineers, and subcontractors. Work performed under this contract will comply with applicable Federal, State, and Local Safety and Occupational Health laws and regulations. Through careful planning and implementation of corporate and site-specific safety protocols, Sevenson will strive for zero accidents and incidents on the project.

1.2 Safety and Health Policy Statement

Sevenson's management is committed to the safety of each and every employee. There is no place at Sevenson for an employee who will not work safely or who will endanger the safety of his fellow workers. It is essential that all Managers and Supervisors insist on the maximum safety performance and awareness of all employees under their direction by enthusiastically and consistently administering all safety rules and regulations. It is Sevenson's policy to take the necessary actions in engineering, planning, designing, assigning and supervising work operations, to create a safe work-site. Sevenson will:

- Maintain safe and healthful working conditions.
- Provide and assure the use of all necessary personnel protection equipment to ensure the safety and health of site employees and the public at large.
- Require that site work be planned to provide a range of protection based on the degree of hazards encountered under actual working conditions.
- Provide site workers with the information and training required to make them fully aware of known and suspected hazards that may be encountered, and of the appropriate methods for protecting themselves, their co-workers, and the public at large.

1.3 Drug and Alcohol Policy

Sevenson Environmental is committed to providing a safe, efficient, and productive work environment for all employees. Using or being under the influence of drugs or alcohol on the job may pose serious safety and health risks. To help ensure a safe and healthful working environment, employees may be asked to provide body substance samples (such as urine and/or blood) to determine the illicit or illegal use of drugs and alcohol. Refusal to submit to drug testing may result in disciplinary action, up to and including termination of employment.

Under the Drug-Free Workplace Act, an employee who performs work for a government contract or grant must notify Sevenson of a criminal conviction for drug-related activity occurring in the workplace. The report must be made within five days of the conviction. Employees with questions on this policy or issues related to drug or alcohol use in the workplace should raise their concerns with their supervisor or the Human Resources Department without fear of reprisal.

Copies of the above drug testing policy (Sevenson's Substance Abuse Program) will be provided to **all employees**. Employees will be asked to sign an acknowledgement form indicating that they have received a copy of the drug testing policy. Questions concerning this policy or its administration should be directed to the Human Resources Department.

1.4 Project Safety and Health Expectations

The safety and health of workers, clients, the public, and the protection of the environment are fundamental responsibility assumed by Sevenson under this contract. Sevenson will:

- Promote project safety with an objective of zero lost-time accidents.
- Manage activities in a proactive way that effectively increases the protection of site workers, the public, and the environment.
- Reduce safety and health risk by identifying and eliminating hazards from site activities.
- Carry out site activities in a manner that complies with all applicable safety, health, and environmental laws and regulations.

1.5 Project Safety and Health Compliance Program

Compliance with the requirements of applicable Federal, State, and local laws will be accomplished through a combination of written programs, employee training, workplace monitoring, and system enforcement. Continued and regular inspections by supervisors and safety personnel, as well as upper management with total involvement in the safety program will produce an atmosphere of voluntary compliance. However, disciplinary action for violations of project requirements will be taken, when necessary.

All site personnel and visitors entering a Contamination-Reduction Zone or Exclusion Zone at the site will be required to read and verify compliance with the provisions of this SSHP and specific appendices. In addition, visitors will be expected to comply with relevant Occupational Safety and Health Administration (OSHA) requirements such as medical surveillance, training, and personal protective equipment. In the event that a person does not adhere to the provisions of the SSHP, he/she

will be requested to leave the work area. All nonconformance incidents will be recorded in the Daily Safety and Inspection Log.

The Site Safety and Health Officer (SSHO) will conduct impromptu surveillance on a daily basis of all work areas and subcontractor's activities to ensure that safety and health is properly implemented. In addition, any reports from employees concerning unsafe work practices, acts, or conditions will be investigated promptly. Unsafe acts, practices, or conditions will be reported to the responsible supervisor at the time of inspection.

The safe and efficient work practices of this company require a spirit of teamwork and cooperation from all employees. Also required are uniform standards of expected behavior. Employees who refuse or fail to follow the standard set forth by this plan, the Severson Corporate Health and Safety Plan and/or regulatory standards, will subject themselves to disciplinary action up to, and including discharge. In cases not specifically mentioned, employees are expected to use good judgment and refer any questions to their supervisors.

1.6 Project Safety Incentive Program

It is expected that all employees perform their assigned tasks in a safe and healthful manner. Therefore, safe work performance is a key element in an employee's review of his/her suitability for continued employment.

In addition to individual incentives there are also awards given to crews who have completed a project without a lost time accident or illness. These awards have included dinners, jackets, hats, and sweatshirts.

1.7 References

During development of this SSHP, consideration was given to current safety and health standards as defined by the USACE, United States Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA), and the National Institute for Occupational Safety and Health (NIOSH). Specifically, the following reference sources have been utilized in the development of this SSHP:

- OSHA Regulations: 29 CFR 1910 and 1926;
- USEPA Standard Operating Safety Guides, June 1992;
- NIOSH/OSHA/Coast Guard (USCG)/USEPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities";
- NIOSH Pocket Guide to Chemical Hazards, June 1997;
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values for Chemical Substances and Chemical Agents, 2000;
- Hazardous Waste Handbook for Health & Safety, Martin, Lippitti, Prothero, 1987;
- Handbook of Toxic and Hazardous Chemicals and Carcinogens, Sittig, 1985;
- USACE, Safety and Health Requirements, EM 385-1-1, 3 November 2003;

- USACE, Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste (HTRW) Activities, ER 385-1-1, 01 July 2003;
- Project Specifications for Operable Unit 2-Building Demolition Cornell-Dubilier Electronics superfund Site, Malcolm Pirnie, Inc., September 2006.

In addition to the above-referenced documents, Severson has established a comprehensive and realistic Safety, Health, and Environmental Program based on past experience, sound engineering practice, employee training, and enforcement of Safety and Health regulations to prevent unreasonable Safety and Health risks. For specific procedures/programs associated with this project, refer to the Severson Corporate Health and Safety Plan. A copy of the Severson Corporate Health and Safety Plan will be on site.

1.8 Site Safety and Health Plan Revisions

The development and preparation of this SSHP has been based on site-specific information provided to Severson. Should any unforeseen hazard become evident during the performance of the work, the SSHO will bring such hazard to the attention of the Contracting Officer Representative both verbally and in writing for resolution as soon as possible. In the interim, Severson will take necessary actions to maintain safe working conditions in order to safeguard on-site personnel, visitors, the public, and the environment. Modifications of any portion or provision of the SSHP will be requested in writing from the Contracting Officer by the SSHO, and authorized in writing. No changes to the SSHP will be allowed until the item has been reviewed and an addendum prepared and approved by Safety and Health Manager. Changes to SSHP will be documented and approved by using the "*Safety and Health Plan Revision Request Form*", refer to *Attachment 3 – Safety and Health Forms*.

1.9 Site Information

The Cornell-Dubilier Electronics Superfund Site (the Site) is located at 333 Hamilton Boulevard in the Borough of South Plainfield, Middlesex County, New Jersey. The Site consists of approximately 26 acres including the Hamilton Industrial Park, contaminated portions of the Bound Brook adjacent to and downstream of the industrial park, and contaminated residential, municipal, and commercial properties in the vicinity of the former Cornell-Dubilier Electronics Corporation, Inc. facility. The Site contains numerous subdivided buildings, numbered 1 through 18, some of which are currently used by several commercial and light industrial operations. The Site is bounded by the Lehigh Valley Railroad to the northeast, Factory Street to the southeast, Spicer Avenue to the southwest, and by Hamilton Boulevard. The area is a busy, heavily developed mixed-use neighborhood.

The developed portion of the facility (the northwestern portion) comprises approximately 45 percent of the total land area and contains buildings, a system of catch basins to channel storm water flow, and paved roadways. Several of the catch basins drain into a storm water collection system whose outfalls discharge at various locations along Bound Brook. The other 55 percent of the property is predominately vegetated. The central part of the undeveloped portion is primarily an open field, with some wooded areas to the northeast and south, and a deteriorated, partially paved area in the middle. The northeast and southeast boundaries consist primarily of wetland area adjacent to Bound Brook,

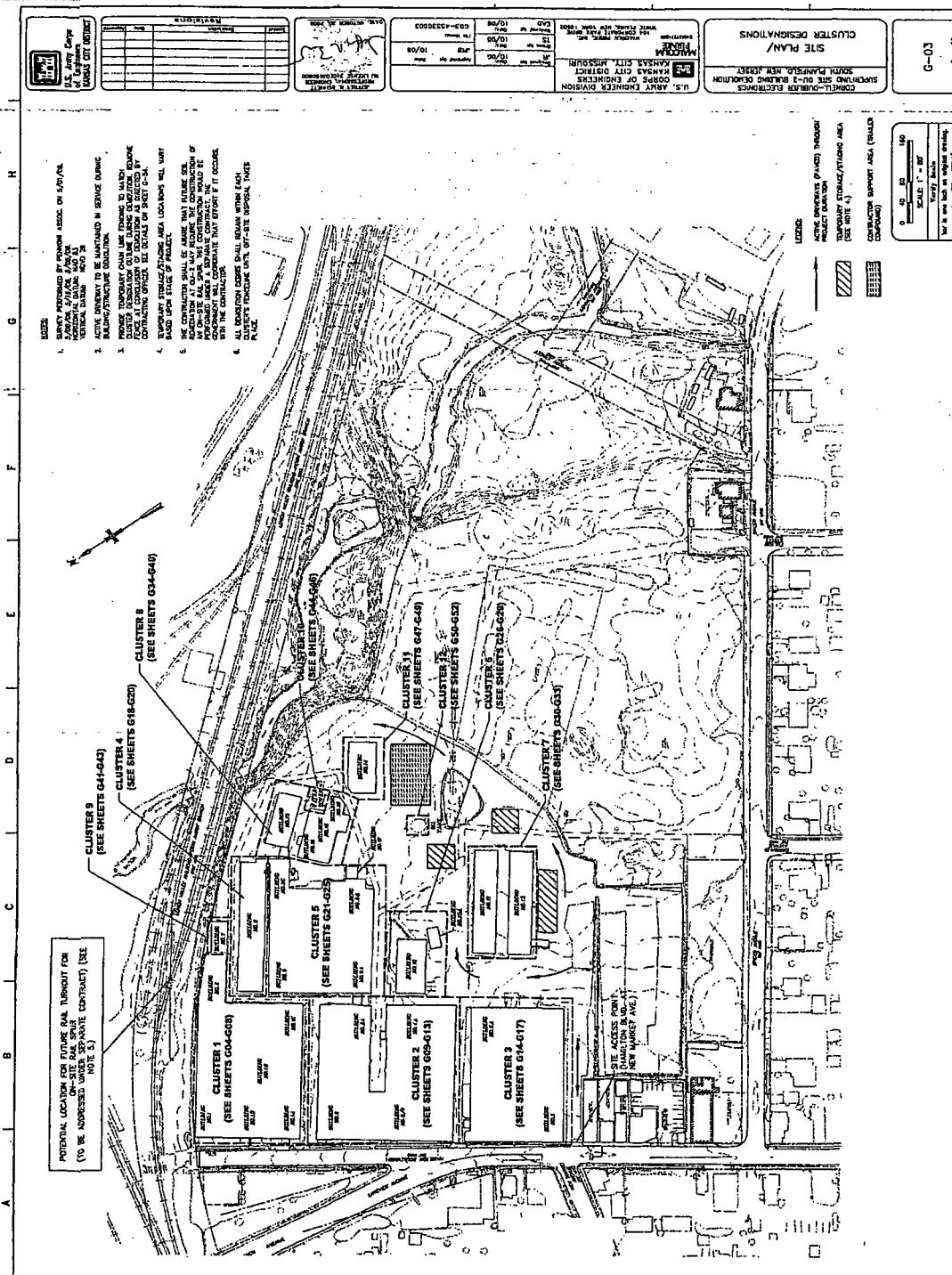
which flows from the eastern corner across the northeastern border of the undeveloped portion of the facility.

Cornell-Dubilier Electronics operated what is now Hamilton Industrial Park from 1936 to 1962, manufacturing electronic components including capacitors. Polychlorinated biphenyls (PCBs) and chlorinated organic degreasing solvents were used in the manufacturing process. Based on historic site practices, portions of the Site have the potential to be contaminated with asbestos, lead, mercury, PCBs, TCE, and dechlorination products, and other constituents of potential concern (COPCs).

Previous studies and evaluations document the presence of hazards at the site including the presence of large amounts of asbestos, metals, PCB containing lighting ballasts and transformers and capacitors and other hazardous substances which must be abated and/or removed prior to demolition of the site buildings.

The area to be remediated in this remedial action phase is Cluster 12. Refer to *Figure 1 - "Site Location Map"*.

Figure 1 – Site Map



2.0 ORGANIZATION AND RESPONSIBILITIES

While the Severson Safety and Health Department directs and supervises the overall Safety, Health and Environmental Program, the responsibility for Safety and Health extends throughout our organization from top management to every employee. For this reason, it is each person's duty to notify the management personnel if a hazardous condition is identified and to make a "stop work" call if the condition represents an immediate danger to life or health, until the SSHO can make a further determination. The following are the Severson project personnel positions and responsibilities for this project. Refer to *Figure 2 – "Organizational Chart"*.

- **Corporate Project Manager:** Albert LaGreca
- **Project Manager:** Kim Lickfield
- **Project Superintendent:** Wayne Kostuk
- **Safety and Health Manager:** Paul Hitcho, Ph.D., CIH
- **Occupational Physician:** Dr. Peter Greaney
- **Site Safety and Health Officer:** Sam Tavelaris
- **First Aid/CPR Qualified Personnel:** Sam Tavelaris, TBD
- **Subcontractors:** TBD

2.1 Corporate Project Manager

The Corporate Project Manager directs and manages all aspects of the project in compliance with all contract and technical requirements. The Corporate Project Manager will monitor and control all subcontractors to achieve optimal performance and ensure safe, high quality performance that complies with all contract requirements.

2.2 Project Manager

The Project Manager reports to the Vice President of Operations. His responsibilities include coordinating project activities with the Project Superintendent and serving as the primary liaison with the Contracting Officer Representative. The Project Manager prepares all correspondence, submittals, and other documentation required for the project; coordinates schedules; and administers the contract. The Project Manager prepares reports and documentation, supervises inspection personnel, and reviews and approves procurement and subcontract activities.

2.3 Project Superintendent

The Project Superintendent supervises and coordinates all construction crew activities relating to site preparation, excavation, shipping, and restoration. The Project Superintendent has the operational responsibility for the implementation of the SSHP on this project. This includes establishing an attitude of concern for safety matters by initiating prompt corrective action of hazards brought to his attention, and ensuring that the project safety and health requirements are initiated and observed by all project personnel. The Project Superintendent is the Competent Person for the operations at the site.

The Superintendent plans and requires that all work be performed in compliance with this SSHP, the Severson Corporate Health and Safety Plan and/or the client's safety program including all applicable local, state, and federal regulations. He will impress upon all subcontractors' supervisory personnel a sense of responsibility and accountability of each individual to maintain a safe workplace and to work in a safe manner.

2.4 Safety and Health Manager (SHM)

Responsible to the Program Manager, the Safety and Health Manager formulates, administers and coordinates programs for the company to reduce the risk of loss due to employee injury, regulatory non-compliance, general liability, fire, theft, or damage. The Safety and Health Manager will develop written detailed policies and procedures covering elements in the Safety, Health and Environmental Program. The Safety and Health Manager will:

- Be responsible for the development, implementation, oversight, and enforcement of the SSHP.
- Conduct initial site-specific training.
- Be present onsite during the first day of remedial activities and at the startup of each new major phase.
- Visit the site as needed and at least once per month for the duration of activities to audit the effectiveness of the SSHP and be available for emergencies.
- Provide onsite consultation as needed to ensure that the SSHP is fully implemented.
- Coordinate any modifications to the SSHP with the Site Superintendent, the SSHO, and the Contracting Officer.
- Provide continued support for upgrading/downgrading the level of personal protection.
- Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and Personal Protective Equipment (PPE).
- Serve as a member of the Severson's quality control staff.

2.5 Certified Industrial Hygienist (CIH)

Under direction of the Safety and Health Manager, the CIH will assist in the development, implementation, and enforcement of the SSHP, provide consultation, review air monitoring data; and assist in safety audits and document review. Visit the site as needed and at least once per quarter for the duration of activities.

2.6 Occupational Physician

Under the direction of the Safety and Health Manager, the Occupational Physician will be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120(f), and 1926.53(f). The Occupational Physician will provide the Safety and Health Manager with a written opinion of each employee's ability to perform hazardous remedial work.

2.7 Site Safety and Health Officer (SSHO)

Under the direction of the Safety and Health Manager, the SSHO will be responsible for the implementation of this SSHP and for the daily coordination of safety activities with the Project Superintendent and the Contracting Officer Representative to ensure that the planned work objectives reflect adequate safety and health considerations. The SSHO will submit to the Contracting Officer Representative Certificates of Worker/Visitor Acknowledgements for site personnel prior to initial entry onto the site. He will maintain a complete copy of this plan (and its supplements and addenda) at the site during all field activities and assure that all workers and visitors are familiar with it. He will perform site-specific training and briefing sessions for employee(s) prior to the start of field activities at the site and a briefing session each day before starting work. He will ensure the availability, proper use and maintenance of specified personal protective equipment, decontamination equipment, and other safety and health equipment. He will maintain a high level of safety awareness among team members and communicate pertinent matters to them promptly. The SSHO will:

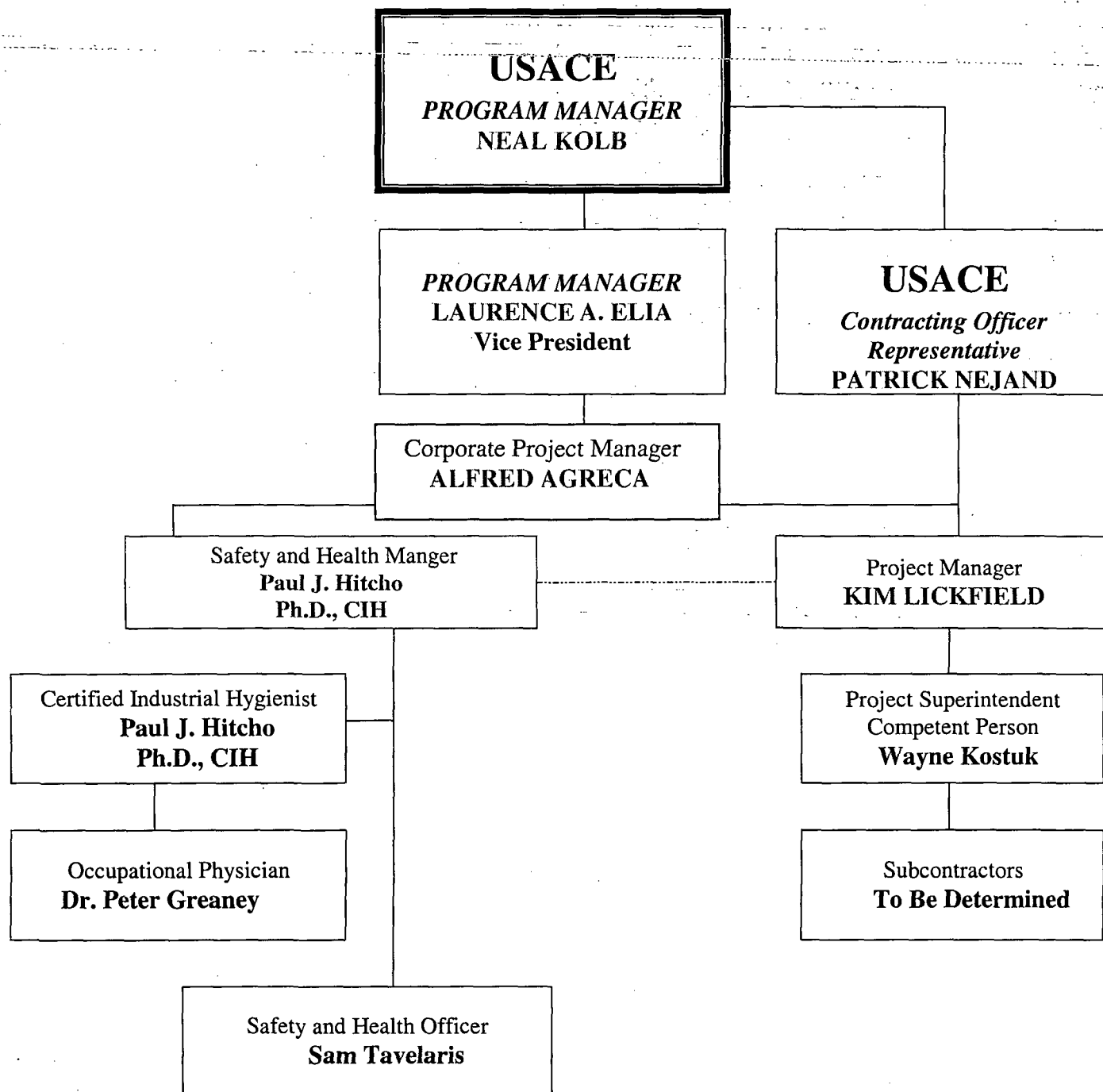
- Assist and represent the Safety and Health Manager in on-site training and the day-to-day on-site implementation and enforcement of the accepted SSHP.
- Be assigned to the site on a full time basis for the duration of field activities. The SSHO will have no duties other than Safety and Health related duties.
- Have the authority to ensure site compliance with specified safety and health requirements, Federal, state and OSHA regulations; and all aspects of the SSHP. This includes, but is not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination site control, standard operating procedures used to minimize hazards, safe use of engineering controls; the emergency response plan, confined space entry procedures, spill containment program, and preparation of records. This will be accomplished by performing a daily safety and health inspection and documenting results on the Daily Safety Inspection Log.
- Stop work activities if unacceptable health or safety conditions exist, and take necessary action to re-establish and maintain safe working conditions.
- Consult and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.
- Serve as a member of the Severson's quality control staff on matters relating to safety and health.
- Conduct accident investigations and prepare accident reports.
- Review results of daily quality control inspections and document safety and health findings in the Daily Safety Inspection Log.
- Coordinate with Site Management and the Safety and Health Manager, recommend corrective actions for identified deficiencies, and oversee the corrective actions.

2.8 Subcontractors

Subcontractors utilized during remedial activities at the CORNELL-DUBILIER ELECTRONICS site are covered by this SSHP and will be provided a copy of the plan prior to commencing work. The Severson SSHO will verify that subcontractor employee training, medical clearance, and respirator fit test records are current and will monitor and enforce compliance with the established plan and standard operating procedures. As with all site personnel, subcontractors will be briefed on the provisions of this plan and attend all daily toolbox and weekly safety meetings.

Sevenson will continually monitor a subcontractor's safety performance. Sevenson will observe subcontractors for hazards or unsafe practices that are both readily observable and occur in common work areas. The SSHO will note subcontractor work practices on the daily Safety and Health report. If non-compliance or unsafe conditions or practices are observed, the subcontractor safety representative will be notified and corrective action will be required. The subcontractor will determine and implement necessary controls and corrective actions. If repeat non-compliance/unsafe conditions are observed, the subcontractor will be required to stop affected work until adequate corrective measures are implemented.

Figure 2 - Organizational Chart



3.0 HAZARD/RISK ANALYSIS

Uncontrolled hazardous material sites can cause a multitude of health and safety concerns, any of which can result in serious injuries and/or illnesses of workers. Some hazards are a function of the physical, biological, or chemical nature of the site itself. Others are a direct result of the construction being done. Based upon the information provided to Severson regarding the primary historical uses of the property and the knowledge of the current conditions, the overall Safety and Health hazard assigned to the contemplated activities at the Site is determined to be low to moderate.

3.1 Site Tasks and Operations

Work includes hazardous materials removal and disposal, above grade fuel oil storage tank removal and disposal, asbestos abatement; sampling and analysis of soil, water, air, and building material; and demolition of buildings and structures. All aspects of the work will be described in the Remedial Action Work Plan submitted under a separate cover.

Severson has developed an Activity Hazard Analysis (AHA) for major phases of work of the remedial action. A major phase of work is defined as an operation involving a type of activity presenting hazards not experienced in previous operations, or where a new subcontractor or work crew is to perform the specified phase. The analysis will define the activity being performed and identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard. An AHA will also be prepared when new tasks are added, job situations change, or when it becomes necessary to alter safety requirements; refer to **Attachment 1 - "Activity Hazard Analysis"**. Work will not proceed on a particular task/work area until the AHA has been reviewed and a preparatory meeting has been conducted. General hazards associated with remedial activities are described below.

A preparatory meeting will be conducted by the SSHO for site personnel prior to their initiating any new or differing site activities. At the preparatory meeting, the SSHO will ensure that site personnel are knowledgeable of the SSHP and understand the hazards and controls of the activity to be performed.

3.2 Hazards

The following potential hazards may be encountered during the remedial activities at the Cornell-Dubilier site:

3.2.1 Safety/Physical Hazards

Potential safety hazards include electrical, heavy equipment/vehicle traffic, material handling, hand and power tools, noise exposure, excavation hazards, slip/trips/falls, heat and cold stress, fire, explosion,

oxygen deficiency, building demolition, and falls from elevation. Safety/Physical hazards associated with the project are presented below.

3.2.1.1 Electrical

Overhead power lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if contacted or severed during site operations. A minimum distance of 10 feet will be present between overhead wires and equipment. This distance will vary according to voltage, the greater the voltage, the greater the clearance between any part of the equipment and the power line; refer to **Table 1 - Minimum Clearance from Energized Overhead Electrical Lines**. When required, a spotter will be utilized to maintain a safe distance between equipment and overhead wires. The basic rule is, "Don't locate equipment in a position where it can come in contact with overhead power lines." Maintain the required distance from the lines. Overhead electrical power lines will be considered energized unless the person owning such line, or operating officials of the electrical utility supplying the line assures that it is not energized and it has been visibly grounded.

Table 1 - Minimum Clearance From Energized Overhead Electrical Lines	
Nominal System Voltage	Minimum Rated Clearance
0 to 50 kV	10 Feet (3 m)
51 to 200 kV	15 Feet (4.5 m)
201 to 300 kV	20 Feet (6 m)
3001 to 500 kV	25 Feet (7.5 m)
501 to 750 kV	24 Feet (10.5 m)
751 to 1000 kV	31 Feet (13.5 m)

There are various means of insulating the wires, as well as barriers and alarms that may be available to reduce the risk of injury to workers, but the use of such devices does not change the requirements of any other applicable standards or laws. In addition, these and other measures (such as grounding the equipment itself) may not be fully effective and may create a false sense of security. Only the utility company is authorized to de-energize, insulate, or handle the lines. No one else may attempt these operations.

Electrical equipment used on-site may also pose a hazard to workers. Whenever possible, Severson will use low-voltage equipment with ground-fault interrupters and watertight, corrosion-resistant connecting cables to help minimize this hazard. In addition, lightning is a hazard during outdoor operations, particularly for workers handling metal containers or equipment. In the event of an electrical storm, all operations will cease for the duration of the storm.

No employee will be permitted to work in the proximity of any part of an electrical power circuit unless the person is protected against electric shock by de-energizing the circuit and grounding it, or it has been locked and tagged out. These procedures will be utilized when work has to be performed on energized equipment.

All electrical wiring and equipment will be intrinsically safe for use in potentially explosive environments and atmospheres. Ground-fault circuit interrupters are standard for use at the site.

3.2.1.2 Heavy Equipment/Vehicle Traffic

Considerations for controlling the movement of personnel and equipment in a construction area are vitally important to any project as injuries may occur while working with or adjacent to such equipment. This category includes all operations that utilize moving heavy equipment: excavators, loaders, graders, dozers, and trucks. Severson will take every precaution necessary to ensure the safety of the residents and the on-site personnel during traffic movement operations.

All workers will adhere to all applicable standards and regulations while operating heavy equipment at the site. Operators will be trained and experienced in the use and maintenance of the equipment they are operating. Equipment will be inspected on a daily basis to identify any worn parts, and/or unsafe conditions. Inspections will be documented using the Equipment Checklist; refer to **Attachment 3 – Safety and Health Forms**. Any unsafe equipment will be removed from service until safety defects can be corrected. Equipment operators will not leave their machine unattended while it is running. All equipment will have electronic backup alarms. Each piece of equipment will be equipped with a 5-lb ABC fire extinguisher. No vehicles or equipment will be operated in a careless or unsafe manner. Personnel will wear high visibility reflective vests when working around equipment/vehicles. All personnel will stay a minimum of four feet clear of the operational area of the equipment.

During remedial activities, it is often necessary to have a worker direct the operator. In these cases, close communication between the operator and the laborer is of critical importance. One designated person will give signals to the operator of both equipment and vehicles in the work area. Workers should not take any action unless they have made eye contact with the operator and clearly communicated their intentions. In addition, all machines are equipped with back-up alarms, which are checked daily and repaired immediately. Truck traffic will be controlled by a flagger/spotter, as required.

Maintenance and inspection of vehicles and heavy equipment is a vital part of the overall safety program. Severson has a fully staffed equipment maintenance shop that handles all preventative and overhaul work for our entire vehicle and equipment fleet. As part of the preventative maintenance, all equipment is checked for properly functioning safety devices (e.g., backup alarms, brakes, lights, fire extinguishers, etc.). Before each piece of equipment leaves the shop it must pass a safety checklist. All rental equipment is subjected to a similar inspection when delivered to the job site. Any piece of rental equipment that fails the inspection must be repaired by the vendor before it is accepted for use. In addition, all equipment is inspected in the field prior to the start of each day's activities. If a superintendent, operator, or safety officer detects a defect, the equipment is taken out of service and a properly qualified mechanic is dispatched from the shop to make the repairs on-site. All heavy equipment used at the site will be equipped with rollover protective structures (ROPS) in accordance with EM 385-1-1 16.B.12.

3.2.1.3 Material Handling

Various materials and equipment may be handled manually during project operations. Care should be taken when lifting and handling heavy or bulky items to avoid back injuries. The following fundamentals address the proper lifting techniques that are essential in preventing back injuries:

- The size, shape, and weight of the object to be lifted must first be considered. Multiple employees or the use of mechanical lifting devices are required for heavy objects.
- The anticipated path to be taken by the lifter should be considered for the presence of slip, trip, and fall hazards.
- The feet will be placed far enough apart for good balance and stability (typically shoulder width).
- The worker will get as close to the load as possible. The legs will be bent at the knees.
- The back will be kept as straight as possible and abdominal muscles should be tightened.
- Twisting motions should be avoided when performing manual lifts.
- To lift the object, the legs are straightened from their bending position.
- A worker will never carry a load that cannot be seen over or around.

When placing an object down, the stance and position are identical to that for lifting. The legs are bent at the knees and the object lowered. When two or more workers are required to handle the same object, workers will coordinate the effort so that the load is lifted uniformly and that the weight is equally divided between the individuals carrying the load. When carrying the object, each worker, if possible, will face the direction in which the object is being carried. In handling bulky or heavy items, the following guidelines will be followed to avoid injury to the hands and fingers:

- A firm grip on the object is essential; leather gloves will be used if necessary.
- The hands and object will be free of oil, grease, and water which might prevent a firm grip, and the fingers will be kept away from any points that could cause them to be pinched or crushed, especially when setting the object down.
- The item will be inspected for metal slivers, jagged edges, burrs, and rough or slippery surfaces prior to being lifted.

3.2.1.4 Hand and Power Tools

Hand and power tools are used for various site activities. Procedures for using hand and power tools are as follows:

- Persons using power tools will be trained in their use.
- Ground Faults must be present on all electrical tools.
- Only tools in good condition will be used.
- Tools will be kept clean.
- Guards and shields will be kept on all tools.
- Air couplings will be secured.
- Non-sparking tools will be used in hazardous areas.
- Proper eye protection is critical when using power tools. At a minimum, safety glasses will be required during site operations. Where appropriate, full-face shields will be utilized in addition to the glasses.

3.2.1.5 Noise Exposure

Noise is generated during remedial activities in such operations as transportation of materials and operation of heavy construction equipment. Noise has been defined as unwanted sounds. The human ear can tolerate a certain amount of sound without any harmful effects. Personnel will be provided protection against the effects of hazardous noise exposure whenever sound-pressure levels exceed 85 dB(A) steady-state expressed as a time-weighted average (TWA) or 140 dB(A) impulse in accordance with EM-385-1-1 05.C.01 Sound-pressure level limits.

The USACE standard allows 85 dB (A) for a full 8 hours and for a lesser time when the levels exceed 85 dB (A). It is usually safe to assume that if you need to shout to be heard at arms length, the noise level is at 90 dB (A) or above. Hearing protection will be utilized by personnel operating or working around construction equipment or power tools. Based on the nature of activities to be performed on site, the use of heavy equipment, power tools, and other noise producing devices, Severson personnel are enrolled in a Hearing Conservation Program that meets the requirements of OSHA regulation 29 CFR 1910.95 as part of our Medical Surveillance Program.

Based upon Severson's past experience, it is known that the noise levels emanating from the operation of the heavy equipment often exceed what is allowable for worker exposure. Consequently, equipment operators and personnel working near the equipment are required to wear hearing protection. Hearing protection equipment is provided by Severson.

3.2.1.6 Excavation/Trenching Hazards

The hazard associated with excavation is low to moderate. In general, the main hazard encountered during soil excavation is the cave in of excavation sides with possible burial or crushing of workers. Causes of cave in may include (a) absence of shoring, (b) misjudgment of stability, (c) defective shoring, and (d) undercut sides. Other potential hazards include falling during access/egress, while mounting or dismounting equipment, or stumbling into the excavation. An overhead hazard can result from material, tools, rock, and/or soil falling into the excavation. Flammable atmospheres may also be encountered in an excavation.

Severson will provide adequate shoring or sloping of sides of the excavation. Excavation/trenches will be inspected daily for changing conditions. Air monitoring for airborne contaminants will be performed in areas where contaminated soils are encountered.

Excavation, loading, and stockpiling will be performed in accordance with the Remedial Action Work Plan. Excavation/trenches, regardless of the depth or width, will be barricaded. The use of raised berms, caution signs, and caution tape will be instituted to protect both the public and other personnel on the site. The excavation area will be delineated with caution tape during operations and barricaded/secured with safety fence at the end of each workday. Adequate means of exit, such as ladders, steps, ramps, or other safe means of egress, will be provided and be within 25 feet of lateral travel.

Where personnel are required to enter excavations over 4 feet in depth, sufficient stairs, ramps, or ladders will be provided, which require no more than 25 feet of lateral travel. At least two means of exit will be provided for personnel working in excavations. Where the width of the excavation exceeds 100 feet, two or more means of exit will be provided on each side of the excavation.

3.2.1.7 Slip/Trip/Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but all injuries can be prevented by the following prudent practices:

- Spot-check the work area to identify hazards.
- Establish and utilize a pathway, which is most free of slip and trip hazards.
- Beware of trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads that you can see over.
- Keep work areas clean and free of clutter, especially in storage rooms and walkways.
- Communicate hazards to on-site personnel.
- Secure all loose clothing, ties, and remove jewelry while around machinery.
- Report and/or remove hazards.
- Keep a safe buffer zone between workers using equipment and tools.
- Workers must take particular care when walking on the geotextile-working mat.

3.2.1.8 Heat Stress

Heat stress may be a hazard for workers wearing protective clothing even if the temperature is moderate. The same protective materials that shield the body from chemical exposure prevent heat and moisture from dissipating. Personal protective clothing can therefore create a hazardous condition. Depending on the ambient temperature and the work being performed, heat stress can occur very rapidly - within as little as 15 minutes.

In its early stages, heat stress can cause discomfort and inattention, resulting in impaired functional abilities that can threaten the safety of both the individual and his co-workers. Personnel will be instructed to recognize the symptoms of the onset of heat stress. While it is not anticipated that heat stress monitoring will be required for this project, the SSHO may periodically check all personnel working in thermal stress areas to ensure that the symptoms are recognized. Frequency of heat stress monitoring and checks for symptoms of heat stress will increase with rises in air temperature, humidity, and the degree of exposure to high temperature areas.

When workers are in Level C PPE or higher, an ambient temperature of 72.5° F will be used as an action level to implement pulse monitoring, oral temperatures, and administrative controls, including rest breaks and work rotation to prevent employees from experiencing heat-related health effects including weight loss. The guidance for workers wearing permeable clothing is specified in the current version of the ACGIH Threshold Limit Values for Heat Stress. If actual clothing differs from the ACGIH standard ensemble in insulation value and/or wind and vapor permeability, changes should be made to the monitoring requirements and work rest period to account for these differences. **Table 2 – “Frequency of Physiological Monitoring”** provides the suggested frequency of physiological monitoring for fit and acclimatized workers.

Table 2 - Frequency of Physiological Monitoring		
Adjusted Temperature Calculation	Normal Work Clothing	Impermeable Clothing
90 F (32.2 C) or above	After each 45 minutes of work	After each 15 minutes of work

87.5 - 90.0 F (30.8 - 32.2 C)	After each 60 minutes of work	After each 30 minutes of work
82.5 - 87.5 F (28.1 - 30.8 C)	After each 90 minutes of work	After each 60 minutes of work
77.5 - 82.5 F (25.3 - 28.1 C)	After each 120 minutes of work	After each 90 minutes of work
72.5 - 77.5 F (22.5 - 25.3 C)	After each 150 minutes of work	After each 120 minutes of work

The following parameters should be used when monitoring workers:

Heart rate - Count the radial pulse as early as possible in the rest period to ensure a more accurate reading. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period at the same length. If, at the end of the following work period, the heart rate still exceeds 110 beats per minute, shorten the work period again by one-third.

Oral Temperature - The utilization of oral temperature applies to the time immediately after the worker leaves the contamination reduction zone. Using a clinical thermometer, take the temperature for three minutes. If the oral temperature exceeds 99.6 F (37.6 C), shorten the next work cycle by one-third, without a change to the rest period. If the oral temperature still exceeds 99.6 F (37.6 C) at the end of the following work period, shorten the next work cycle by one-third. Do not permit a worker to perform duties requiring a semi permeable or impermeable garment if the oral temperature exceeds 100.4 F (38.1C). Ear canal readings are a valid method to monitor the temperature of workers who remain in the contamination reduction zone.

The oral temperature shall not exceed 100.4° F. If an employee's pulse rate exceeds the maximum age-adjusted heart rate ($0.7(220-AGE)$), and/or the oral temperature exceeds 100.4° F, the employee shall be required to stop work and rest at the work site or move to an air-conditioned room after proper decontamination. The affected employee may be allowed to return to work after his/her pulse rate has dropped below 100 beats per minute. The SSHO in consultation with the affected employee, and medical personnel if necessary, shall determine whether an employee is ready to return to work. Fluids shall be provided and rest breaks will be taken. The frequency of breaks will increase with the temperature. Such things as cooling vests, portable fans, and breaks in air-conditioned areas shall be used if necessary.

When practicable, the most labor-intensive tasks should be carried out during the coolest part of the day. If necessary, a work/rest regimen will be instituted. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, such as, the Wet Bulb Globe Temperature, duration, and type of activities performed.

A worker who becomes irrational or confused, or collapses on the job should be considered a heat stroke victim and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.

- If no water is available, fanning will help promote cooling.

Any individual showing susceptibility to heat stress will be referred to a physician for evaluation. In addition, the use of prescription drugs can also contribute to the effects of heat stress and will be considered during the assignment of work. Cool (50°-60°F) water or a sport drink, such as Gatorade, will be made available to workers and encourage them to drink small amounts frequently, (e.g., one cup every 20 minutes). Ample supplies of liquids will be placed close to the work area.

3.2.1.9 Cold Stress

Cold injury (frostbite and hypothermia) and impaired ability to work are hazards to persons working outdoors in low temperatures at or below freezing. Extreme cold for a short time may cause severe injury to exposed body surfaces (frost nip or frostbite), or result in profound generalized cooling (hypothermia). Areas of the body which have high surface area-to-volume ratio such as fingers, toes, and ears, are the most susceptible to frost nip or frostbite.

Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked. The wind chill factor is the cooling effect of any combination of temperature and wind velocity or air movement. **Table 3 – Wind chill Index** should be consulted when planning for exposure to low temperatures and wind. The wind chill index does not take into account the specific part of the body exposed to cold; the level of activity, which affects body heat production; or the amount of clothing being worn.

When practicable, the most sedentary tasks should be carried out during the warmest part of the day. If necessary, a light-work rotation schedule should be instituted or the work area heated. Heavy work that will cause heavy sweating resulting in wet clothing must also be monitored. The work/rest regimen consists of alternating periods of work and rest. The duration of these alternating periods will depend on the environmental conditions at the job site, (i.e., the Wind Chill Temperature, duration, and type of activities performed).

Table 3 - Wind Chill Index

Wind (mph)	Actual Temperature (° F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
	Equivalent Temperature (° F)												
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58

30	22	16	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-42	-50	-57	-64
Wind Chill (°F) = $35.74 + 0.6215T - 35.75(V0.16) + 0.4275T(V0.16)$ T = Air Temperature (°F) V = Wind Speed (mph)							Frostbite occurs in 15 minutes or less						

Table 4 - Maximum Daily Time Limits for Exposure at Low Temperatures gives the recommended time limits for working in various low temperature ranges.

Table 4 - Maximum Daily Time Limits for Exposure at Low Temperatures	
Temperature Range (F)	Maximum Daily Exposure
30 to 0	No limit, providing that the person is properly clothed.
0 to -30	Total work time: 4 hours. Alternate 1 hour in and 1 hour out of the low-temperature area.
-30 to -70	Two periods of 30 minutes each at least 4 hours apart. Total low temperature work time allowed is 1 hour.
-70 to -100	Maximum permissible work time is 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air, is recommended.

Table 5 - Work/Warm-up Schedule applies to any 4-hour work period with moderate to heavy work activity, warm-up periods of ten (10) minutes in a warm location and an extended break (e.g., lunch) at the end of the 4-hour period in a warm location. For light-to-moderate work (limited physical movement) apply schedule one step lower. For example, at -35° C (-30° F) with no noticeable wind, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period.

Table 5 - Work/Warm-up Schedule											
Air Temperature - Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph wind		15 mph wind		20 mph wind	
°C (approx.)	°F (approx.)	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks	Max Work Period	No. of Breaks
-26 ^o to -28 ^o	-15 ^o to -19 ^o	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29 ^o to -31 ^o	-20 ^o to -24 ^o	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32 ^o to -34 ^o	-25 ^o to -29 ^o	75 min	2	55 min	3	40 min	4	30 min	5	Non-Emergency Work Should	
-35 ^o to -37 ^o	-30 ^o to -34 ^o	55 min	3	40 min	4	30 min	5	Non-Emergency			

-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-Emergency Work Should Cease	Work Should Cease	Cease
-40° to -42°	-40° to -44°	30 min	5	Non-Emergency Work Should Cease				
-43° & below	-45° & below	Non-Emergency Work Should Cease		Non-Emergency Work Should Cease				

To guard against cold injuries, workers should wear appropriate clothing and use warm shelters for removing personal protective equipment. The personnel decontamination trailer will be used as a warm shelter when required. The SSHO may periodically monitor workers' physical conditions, specifically checking for symptoms of frostbite.

3.2.1.10 Fires/Explosions Hazard

If required, the SSHO will establish areas approved for welding, cutting, and other hot work. Hot work (welding, burning, cutting, etc.) conducted on-site must comply with the following Hot Work Procedures. A Hot Work Permit will be obtained from the SSHO if required. All personnel will be protected from welding radiation, flashes, sparks, molten metal, and slag. All welding, burning, and cutting equipment will be inspected daily by the operator. Defective equipment will be tagged and removed from service, replaced or repaired, and re-inspected before again being placed in service. All welders will be properly trained in the safe operation of their equipment, safe welding/cutting practices, and welding/cutting respiratory and fire protection.

Cutting or welding will NOT be permitted in the presence of explosive atmospheres (mixtures of flammable/combustible gases, vapors, liquids, or dusts with air), or explosive atmospheres that may develop inside un-cleaned or improperly prepared drums, tanks, or other containers, and equipment which has previously contained such materials.

Where practical, all combustible material will be relocated at least 35 feet away from the hot work site. Where relocation is impractical, combustibles will be protected with flame proofed covers or otherwise shielded. At a minimum, two fully charged and operable fire extinguishers appropriate for the type of possible fire (10- ABC), will be available at the work area. A fire watch will be required whenever hot work is performed and for a minimum of 30 minutes after hot work is complete.

A hot work permit will be completed by the SSHO, reviewed with personnel who will perform the hot work, and posted near the work area. The hot work permit is good only for the date issued and is valid only for the work shift for which it is issued. If at any time during the hot work operation a change in conditions at the work site is suspected, such as a release of flammable gases or vapors in the work area, work will be stopped immediately and the SSHO will be notified. Such work stoppage invalidates the hot work permit, and a new permit will be completed after inspections and tests have been performed by the SSHO; *refer to Attachment 3 – Safety and Health Forms for the Hot Work Permit.*

3.2.1.11 Oxygen Deficiency

Oxygen deficiency may occur on-site during excavation operations or storage tank entry, due to displacement of oxygen by other gases in these areas. The oxygen content of ambient air is 20.9 percent. Physiological effects of oxygen deficiency are readily apparent when the oxygen concentration

decreases below 16 percent. Oxygen-deficient conditions may be controlled by air monitoring areas for oxygen concentrations using an O₂/LEL/CO Meter. Air monitoring will reduce risks by indicating when action levels have been exceeded. Supplied-air type respiratory protection will be utilized in areas known to have oxygen concentrations below 19.5 percent. All operations will cease and desist if oxygen concentrations exceed 23.5 percent.

3.2.1.12 Building/Structure Demolition

During building/structure demolition it is anticipated that a track hoe and shear will be utilized. Applicable OSHA standards for building demolition, 29 CFR 1926.850 Subpart T, apply. An engineering survey will be made by a competent person prior to the commencement of any demolition activities. The engineering survey will determine the condition of the framing, floors, and walls, as well as the possibility of an unplanned collapse of any portion of the structure.

Prior to commencement of any demolition activities, all electric, gas, water, steam, sewer, and other service lines will be shut-off, capped, or otherwise controlled from outside of the building. Any utility company involved will be notified in advance of any planned demolition activities.

3.2.1.13 Fall From Elevation

To prevent falls and injuries when employees work in areas where fall hazards cannot be eliminated by reasonable means, personnel will be required to use a full body harness and shock-absorbing lanyard. Personnel will make maximum use of primary fall protection systems, such as scaffolding and scissors lifts. These systems will be equipped with standard guardrails and safe means of access/egress.

Before any employee attempts to work in an area where a risk of falls exists, they must equip themselves with suitable fall-arresting equipment. Personnel riding on or working from a scissors lift must secure their safety lanyards to the basket at all times.

The fall protection equipment will be properly fitted and will not restrict the movements of the worker. Full safety harnesses are required for any work performed over six (6) feet in elevation unless work is being performed from a ladder. Work from portable ladders or fixed ladders less than 24 feet in height that are set up and properly used do not require fall protection. However, if fall protection can be properly utilized, it will be.

Lanyards of the shortest workable length must be attached to a secure point in the vicinity of the work area. The line will be long enough not to restrict the worker's movements, but short enough to prevent tripping over the line and falls beyond the worker's extended reach for self-rescue; in any case, not over six (6) feet.

3.2.2 Chemical Hazards

Only a limited number of soil samples were collected and analyzed for chemical contaminants during the Remedial Investigation. The predominant chemicals detected were semi-volatile organic compounds (SVOCs) and metals, although some volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) were also detected at low concentration. Chemical contamination

was not widespread. The potential exposure during remedial activities from chemical contamination identified at the site is expected to be minimal. Chemical Information Sheets for two of the contaminants of concern (lead and PCBs) can be found in **Attachment 2**.

Operational chemicals may be brought to the project-site for use in activities supporting the remedial activities. These chemicals are used for fuels in operating heavy equipment, glues for welding pipes, painting, etc. The use of operational chemicals is regulated by OSHA under the Hazard Communication Standard (29 CFR 1910.1200). Material Safety Data Sheets (MSDSs) for operational chemicals are kept on file in the project office trailer. An inventory list of the anticipated operational chemicals (Hazardous Chemical Inventory List) for use at the CORNELL-DUBILIER ELECTRONICS site will be maintained at the site and updated as new material is received.

3.2.3 Biological Hazards

There is a potential for encountering biological hazards such as bites from ticks, rodents, and snakes, and exposure to poison ivy and oak. Biological hazards and controls are presented below.

3.2.3.1 Needlestick Injuries

A needle stick injury occurs when a carelessly discarded hypodermic needle penetrates your skin, for example, through stepping on a syringe and/or needle that has been discarded at the site. Needle stick injuries transmit infectious diseases, especially blood-borne viruses. Accidental punctures by contaminated needles can inject hazardous fluids into the body through the skin. There is potential for injection of drugs, but injection of infectious fluids, especially blood, is by far the greatest concern. Accidental injection of blood-borne viruses is the major hazard of needle stick injuries, especially the viruses that cause AIDS (the HIV virus), hepatitis B, and hepatitis C.

General Universal Precautions will be observed to prevent contact with hypodermic needles or other potentially infectious materials. Work practice controls will be used to eliminate or minimize employee exposure (i.e. inspect area prior to work). If you are stuck by a discarded needle, immediately report it to the SSHO. Following a report of an exposure incident, the employer will immediately make available to the exposed employee medical evaluation counseling, treatment, and post-exposure prophylaxis, when medically indicated.

3.2.3.2 Ticks

Working in tall grass, especially in or at the edge of wooded areas, increases the potential for ticks to affect workers. Ticks are vectors of many different diseases including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever, and Lyme disease. They attach to their host's skin and intravenously feed on its blood creating an opportunity for disease transmission. Covering exposed areas of the body and the use of commercially prepared tick repellent, such as N, N-Diethyl-m-toluamide (DEET), help prevent tick bites. Please note that there are some concerns with the use of DEET on skin and associated potential adverse health affects. Periodically during the workday, employees working in tall grass will inspect themselves for the presence of ticks and notify the SSHO of any tick bites as soon as possible.

3.2.3.3 Rodents and Wildlife

During site operations, animals such as mice and rodents may be encountered. Workers will use discretion and avoid all contact with animals. If these animals are interfering with site operations, or if dead animals are observed, the SSHO should be contacted immediately for assistance and advice.

Hanta virus Pulmonary Syndrome (HPS) is a disease that may be contracted when a person comes into contact with Hanta virus-infected rodents, their nesting materials, droppings, urine, or saliva. HPS may develop when virus particles are inhaled, absorbed through broken skin or the eyes, or when bitten by an infected animal. The majority of HPS cases have been reported in the southwest; however, there is the potential for Hanta virus transmission in most regions with rodent populations. Risk to workers at the site is considered to be low; however, the severity of disease is high. Therefore, field personnel should be aware of the potential for exposure and should avoid coming into contact with rodents or their burrows or dens.

Rabies is an acute, infectious, often fatal viral disease transmitted to humans by the bite of warm-blooded, infected animals. This disease affects the central nervous system of humans. A rabid animal may be recognized by signs of raging, uncontrollable movement and possible foaming near or at the mouth. The best control method is avoidance of animals that could be rabid. If bitten by a potentially rabid animal, contact the SSHO immediately. The animal in question must be captured or trapped so that it can be tested for rabies. The bitten individual will seek medical attention immediately.

3.2.3.3 Poisonous Plants

Poison ivy, poison oak, and poison sumac are identified by three or five leaves radiating from a single stem. Poison ivy is in the form of a vine while oak and sumac are bush-like. All of these plants can produce a delayed allergic reaction. The plant tissues have an oleoresin, which is active in live, dead, and dried parts. The oleoresin may be carried through smoke, dust, contaminated articles, and the hair of animals. Symptoms usually occur 24 to 48 hours after exposure resulting in rashes that itch and blister. Should exposure to any of these plants occur, wash the affected area with a mild soap and water within one-half hour, but do not scrub the area. The best preventative measure for poisonous plants is recognition and avoidance.

3.2.3.4 Snakes

The degree of toxicity resulting from snakebites depends on the potency of the venom, the amount of venom injected, and the size of the person bitten. Poisoning may occur from injection or absorption of venom through cuts or scratches. The most effective way to prevent snakebites is to avoid snakes in the first place. Personnel should avoid walking at night or in high grass and underbrush. Visual inspection of work areas should be performed prior to activities taking place. The use of leather boots and long pants will be required, since more than half of all bites are on the lower part of the leg. No attempts at killing snakes should be made; many people are bitten in such an attempt. Personnel will not put their hands in areas where they cannot be seen.

3.2.3.5 Flying Insects

Flying insects such as mosquitoes, wasps, hornets, and bees may be encountered while project activities occur. Mosquito bites can be effectively prevented by the use of insect repellants containing DEET. Please note that there are some concerns with the use of DEET on skin and associated potential adverse health affects. Treatment for insect bites and bee stings can be effected by the use of commercially prepared ointments. Personnel who are allergic to bee stings will notify the SSHO prior to working on the project.

3.2.3.6 Spiders

Personnel will be alert to the potential for spider bites. Spiders sometimes establish residence in stored clothing and PPE. It is advisable for personnel to inspect clothing and PPE for spiders prior to donning. Immediate reporting and medical evaluation is necessary if personnel suspect being bitten by the Brown Recluse spider. If a spider bite is sustained, personnel will report it to the SSHO.

3.3 Engineering Controls

The use of engineering controls for the protection of personnel is the first means of mitigation. This involves the elimination of hazards and the isolation of the workers from the hazards. Implementation of engineering controls can reduce the need for personal protective equipment by separating the worker from the contaminated material. During remedial activities dust and vapors may be generated. The Site Superintendent and SSHO will be constantly alert to the possibility of unacceptable dust levels. Unacceptable dust levels are identified in *Table 8 – Operational Action Levels*. Perimeter air monitoring will be performed in accordance with Section 7.3.

3.3.1 Dust Control

Control measures will be implemented for all operations where dust is likely to be generated. Careful planning and implementation of controls will reduce potential dust concentrations. There are a number of specific construction practices, which will reduce levels of airborne particulates. These include:

- Providing for a misting spray during excavation activities.
- Applying water on and sweeping haul roads.
- Wetting and misting equipment and building faces.
- Spraying mist on buckets during material handling and dumping.
- Hauling materials in properly tarped or watertight containers.
- Reducing the active work area surface and limiting the number of concurrent operations.
- Regular washing of contaminated equipment.

3.3.2 Off-site Tracking of Contamination

A decontamination pad will be constructed prior to any remedial activities. The purpose of this pad will be to remove any excessive soil buildup on construction equipment leaving the work area and for decontamination of heavy equipment upon demobilization. High-pressure washers will be utilized to assist with the decontamination. The pad will be constructed in such a way to contain all water generated.

3.3.3 Noise Control

Noise levels will be controlled to meet the applicable OSHA standards for workers as well as for the off-site community. Excessive noise levels are not expected to be generated from the heavy equipment and machinery needed to complete the work. Protection of individual workers is addressed in Section 3.2.1.5, Noise Exposure, of this plan.

4.0 SAFETY AND HEALTH TRAINING

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all Site personnel who will be performing remedial activities, intrusive sampling, emergency response operations, or come in contact with contaminated material are required to be trained in accordance with the standard.

4.1 General Hazardous Waste Operation Training

Prior to arrival on-site, Severson will be responsible for certifying that the employees meet the requirements of pre-assignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). Severson will provide documentation certifying that each general Site worker has received a minimum of 40 hours of instruction off site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor. All personnel must also receive 8 hours of refresher training annually. At no time should anyone be working on-site without the minimum training requirements. Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals designated as Site Supervisors require an additional 8 hours of training. A certificate of Worker/Visitor Acknowledgement will be completed and submitted for each site worker and visitor who will enter the contamination reduction zone, and/or exclusion zone; *refer to Attachment 3 – Safety and Health Forms for the Field Experience Form.*

4.2 Preparatory Meetings

Preparatory meetings will be conducted by the SSHO for site personnel prior to their initiating any new or differing site activities. At the Preparatory meetings, the SSHO will ensure that site personnel are knowledgeable of the SSHP and understand the hazards and controls of the activity to be performed (review Activity Hazard Analysis).

4.3 Site-Specific Training

All personnel working at the Site during remedial activities will review this SSHP with the SSHO. Personnel will sign an acknowledgment form to document their review and agreement to comply with the provisions of the SSHP. All visitors must sign the visitor's log and wait in the Severson field office for a briefing before entering the Site.

The SSHO will be responsible for ensuring Site visitors are trained in the hazard associated with the Site, to explain emergency procedures, and instruct them in the use of protective gear required during the visit. Visitors meeting requirements of HAZWOPER may be allowed in the Exclusion Zone if conditions permit and if escorted by the SSHO.

4.3.1 Initial Session

Prior to commencement of onsite field activities, all site employees will attend a site-specific safety and health training session. This session will be conducted by the SSHO or designee, to ensure that personnel are familiar with the requirements of this Site-Specific Safety and Health Plan. The initial session will consist of the contents of this SSHP and specific procedures developed for the project. The SSHO or designee will also provide initial site-specific training for replacement employees.

As a minimum the site-specific training will include:

- Explanation of the SSHP.
- Health and Safety Personnel and Organization.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use, and limitations of available safety equipment and proper procedures for its use.
- Personal hygiene and decontamination.
- Respirator fit testing.
- PPE fitting to determine proper size for individuals.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication and the "Buddy System".
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Review applicable Severson Standard Operating Procedures.
- Site Specific Hazard Communication.

4.3.2 Periodic Sessions

Periodic training will be provided at least weekly and prior to each change of operation. The training will address safety and health procedures, work practices, any changes to SSHP, review activity hazard analysis, work task or schedule, results of previous week's air monitoring, and review of safety discrepancies and accidents.

4.4 Safety Meetings

A well-ordered flow of information is essential to a good safety program. Severson, through a program of safety meetings at all levels, intends to accomplish the goals of safety awareness, education, and participation.

The SSHO will conduct daily safety meetings with ALL on-site personnel. An opportunity will be provided for employees to voice safety-related concerns. The SSHO will submit a synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous items, and a signed attendance list.

4.5 Hazard Communication Training

OSHA's standard for hazard communication requires that all workers be informed of potentially hazardous materials used in their work area. Severson provides employees with information and training on hazardous chemicals at their work site at the time of their initial assignment, annually, and whenever a new chemical is introduced into their work site that could present a potential hazard. Personnel are briefed on the general requirements of the OSHA hazard communication standard and duty-specific hazards by their immediate supervisor before they begin any duties on the work site. Personnel transferred from another site are also briefed on the duty-specific hazards by their immediate supervisor before they begin any duties on the work site.

4.6 Excavation/Trenching Competent Person

Supervisory and other essential personnel engaged in excavation activities are required to complete Competent Person Training. This training provides knowledge about soil analysis and classification, use of protective systems, and the requirements of Excavation Standards. The Site Superintendent and the SSHO are designated Excavation/Trenching Competent Persons for this project.

4.7 First Aid/CPR Training

At least two site personnel will be required to complete first aid and cardiopulmonary resuscitation (CPR) training and receive the appropriate certification. CPR certification is renewed annually; first aid certification is renewed every three years. All first aid/CPR training is American Red Cross-approved or in accordance with OSHA standards. Additionally, First Aid/CPR qualified personnel will have received blood borne pathogen training as required by 29 CFR 1910.1030.

5.0 MEDICAL SURVEILLANCE PROGRAM

The Medical Surveillance Program is designed to track the physical condition of employees on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures. The Medical Surveillance Program is a part of the overall Severson Safety and Health program.

5.1 Baseline Medical Monitoring

Each employee must receive a baseline physical, which can be part of an annual medical monitoring program, prior to being permitted to enter the Exclusion Zone or Contamination Reduction Zone. The content of the physical has been determined by Severson's Occupational Physician as suggested by NIOSH/OSHA/USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities. The minimum medical monitoring requirements for work at the Site are as follows:

- Complete medical and work histories
- Physical examination
- Pulmonary function tests (FVC and FEV1)
- Blood chemistry (CBC & SMAC 24)
- Urinalysis with microscopic examination
- Audiometric Testing
- Eye examination and visual acuity
- Chest X-Ray (as directed by the Occupational Physician)
- Electrocardiogram (as directed by the Occupational Physician)
- Other Biological testing as prescribed by the Occupational Physician
- Serum Lead
- Zinc Protoporphyrin

The medical surveillance provided to the employee includes a judgment by the medical examiner of the ability of the employee to use either positive- or negative-pressure respiratory protection equipment. Any individual found to have a medical condition, which could directly or indirectly be aggravated by exposure to these site contaminants, will not be employed for the project. Individuals not capable of satisfying the project requirements for wearing respiratory protection equipment will be evaluated on a case-by-case basis based prior to being employed. A copy of the medical examination is provided at the employee's request.

The employees will be informed of any medical conditions that would result in work restriction or that would prevent them from working at hazardous waste sites. A certificate of Worker/Visitor Acknowledgement will be completed and submitted for each site worker and visitor who will enter the contamination reduction zone and/or exclusion zone.

5.2 Periodic Monitoring

In addition to a baseline physical, all employees require a physical every 12 months unless the advising physician believes a shorter interval is appropriate. The Occupational Physician has prescribed an adequate medical evaluation, which fulfills OSHA 29 CFR 1910.120 requirements. The preassignment medical outlined above is applicable.

All personnel working on the Site that enter an active Exclusion or Contamination Reduction Zone will verify currency (within 12 months) with respect to medical monitoring. Severson will obtain a copy of the physician's written opinion detailing the employee's ability to perform hazardous waste site work.

At termination of employment or reassignment to an activity or location that does not represent a risk of exposure to hazardous substances, an employee may be required to take an exit physical. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of an exit exam.

5.3 Exposure/Injury/Medical Support

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the occupational health physician to advise the type of test required to accurately monitor for exposure effects.

Any employee, who develops a time loss illness exceeding one working day, or injury during the period of the contract, must be evaluated by the occupational health physician. A written statement indicating the employee's fitness, signed by the occupational physician must be submitted prior to the employee entering the work site.

5.4 Medical Records

The results of medical testing and full medical records will be maintained in accordance with 29 CFR Part 1910.1020. A copy of the medical certification will be kept on the Site for each person entering the Contamination Reduction Zone and Exclusion Zone.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section provides an outline of the PPE and guidelines that will be implemented to minimize chemical, physical, and biological exposures and accidents during remedial activities. Where engineering controls and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear PPE.

These include items such as, hard hats, face shields, safety goggles, glasses, hearing protection, foot guards, gloves, reflective vests, etc. The SSHO will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use to prevent damage or loss.
- It will be kept clean, fully functional, and sanitary.
- Must meet all applicable ANSI standards.

Personal clothing and jewelry can present additional safety hazards. Supervisors will ensure that workers wear appropriate clothing, which will not interfere with the PPE. All PPE will be selected in accordance with 29 CFR 1910.132. Severson will provide proper PPE to all employees. All protective clothing will be properly used, stored, selected, and maintained.

Government personnel will be supplied with all required personal protective equipment (excluding air-purifying negative-pressure respirators and safety shoes, which will be provided by the individual visitors). Severson will provide basic training in the use and limitations of PPE to government personnel.

6.1 PPE Hazard Assessment

Selection of the appropriate PPE is a complex process, which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards, routes of potential exposure to employees (inhalation, skin absorption, ingestion, and eye or skin contact), and the performance of the PPE materials (and clothing seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found that will provide continuous protection from the particular hazardous substance. In these cases, the breakthrough time of the protective material should exceed the work duration.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases, layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits, or equipment.

The following are guidelines, which Severson Environmental uses to select PPE. Based on the site characterization and analysis performed during the remedial activities, a combination of PPE has been selected from the different protection levels (i.e., A, B, C, D Modified, or D) as being suitable to the hazards of the work to be performed. Section 3.0 of this plan characterizes and analyzes the chemical, physical, and biological hazards; specific tasks/operations; routes of exposure; and concentrations of contaminants. Characteristics, capabilities, and limitations are summarized in this section.

- **Level A:** The highest level of skin, eye, and respiratory protection (Level A PPE is not anticipated on this project).
- **Level B:** Should be worn when the highest level of respiratory protection is needed, but a lower level of skin protection is needed, compared to that of level A (Level B PPE is not anticipated on this project).
- **Level C:** Should be worn when the criteria for using air-purifying respirators are met, and a lesser or the same level of skin protection is needed, compared to that of level B.
- **Level D Modified:** Should be worn when respiratory protection is not warranted but minimal dermal protection is necessary.
- **Level D:** Level D provides minimal protection against chemical hazards. A work uniform consisting of coveralls and/or long pants and sleeves may be worn in any area without the potential for significant respiratory or skin contact hazards.

Personal Protective Equipment alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound work practices.

6.1.1 Head Protection

All personnel will wear a hard hat that meets the requirements and specifications in ANSI Safety Requirements for Industrial Head Protection Z89.1-1969. Exceptions to this requirement are personnel in the site office and rest and eating areas.

6.1.2 Hand Protection

Outer gloves used on the Site for remedial activities will be either chemical resistant or general purpose. The appropriate glove will be determined by the SSHO for a specific work task. Chemical resistant gloves will be selected using appropriate chemical degradation guides. Leather work gloves will be worn when work activities require the handling of sharp and rough-surfaced objects.

Welder's gloves or any other special type of gloves are considered outer gloves and are to be worn over inner gloves. These special outer gloves will be stored on-site and will be disposed of properly as PPE waste. Inner gloves will always be chemical resistant, will be selected using appropriate chemical degradation guides and will be disposed of as PPE waste.

6.1.3 Eye/Face Protection

No contact lenses are allowed in the Exclusion Zone and Contamination Reduction Zone. Eye/face protection will be worn by all personnel in the Contamination Reduction Zone and Exclusion Zone. Double eye protection will be required when power-washing equipment during decontamination. All eye/face protection provided will be ANSI Z87-1989 approved.

6.1.4 Footwear

Footwear will be steel-toed safety boots/composite and will be worn for all field activities. Chemical-resistant outer boot covers are to be worn in the Exclusion Zone, Contamination Reduction Zone. Boot racks will be provided in the Contaminated Reduction Zone for drying of outer boots.

6.1.5 Respiratory Protection

To control and or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of this program will be to prevent atmospheric contamination. This will be accomplished as far as feasible by accepted engineering control measures (for example, dust suppression). When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection will be used. A respiratory protection program will be implemented that is compliant to the requirements of 10 CFR 20 Subpart H, "Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas" and

29 CFR 1910.134, "Respiratory Protection." Respiratory protection equipment will be NIOSH-approved, and respirator use will conform to ANSI Z88.2.

The respiratory protection program will follow the guidance of 10 CFR 20 subpart H. Additionally, internal exposure evaluations (bioassay) may be required for each individual who participates in wearing a respirator at the Cornell-Dubilier site.

Respirators will be provided when such equipment is necessary to protect the health of the employee. Severson will:

- Provide the respirators, which are applicable and suitable for the purpose intended.
- Be responsible for maintaining a written Respiratory Protective Program in accordance with 29 CFR 1910.134. The employee will use the provided respiratory protection in accordance with instructions and training received.
- Respirators will be selected on the basis of hazards to which the worker is exposed.
- The user will be instructed and trained in the proper use of respirators and their limitations.
- Respirators will be surveyed for unconditional use during breaks and remain in a predetermined area at the Contamination Reduction Zone with the filter cartridges left in place. However, at shift's end, respirator cartridges will be removed from the respirators and placed into the waste prior to the respirator being surveyed for unconditional use and allowed to exit the Contamination Reduction Zone.
- Respirators will be regularly cleaned and disinfected.
- Respirators will be stored in a convenient, clean, and sanitary location.
- Respirators used routinely will be inspected during cleaning. Worn or deteriorated parts will be replaced. Respirators for emergency use, such as self-contained devices, will be thoroughly inspected at least once a month and after each use.
- Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.
- There will be regular inspections and evaluations to determine the continued effectiveness of the program.
- Employees will not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A physician will determine whether an individual is physically fit to wear a respirator. The physician's clearance allows the worker to don a respirator and work in conditions of high ambient temperatures. Heat stress will be closely monitored by the SSHO.

Each respirator will be individually assigned and not interchanged between workers without cleaning and sanitizing. The cartridges/filters will be changed at the first sign of breakthrough based on contaminant warning properties or if the user experiences excessive breathing resistance. The SSHO will make final determination of the frequency of respirator cartridge/filter change-out. Respirators will be cleaned and stored in an uncontaminated atmosphere after each use. Used cartridges will be disposed of with spent PPE. Self-contained breathing apparatus/supplied-air respirators will be inspected before and after use and at least once monthly.

All employees working at the Site during remedial activities who have the potential of wearing a respirator will be fit-tested to ensure they utilize the proper size respirator. Severson will arrange for fit testing. The fit test is conducted according to the manufacturer's suggestions. The test will consist

of a taste and odorous vapor qualitative test. As per OSHA regulations, personnel that are unable to pass a fit test will not enter a work area when respiratory protection is required. In addition, facial hair is prohibited from the respirator seal area. Any person with facial hair will not be permitted to enter a work area where respiratory protection is required, regardless of the fit test results. Documentation of the fit testing will be maintained on-site.

6.2 Levels of Protection

The level of protection must correspond to the level of hazards known or suspected for the specific work activity.

6.2.1 Level B

Level B equipment, used as appropriate, is as follows:

- Positive pressure, full face piece, self-contained breathing apparatus (SCBA) or positive pressure supplied air respirator with escape SCBA (NIOSH-approved)
- Disposable coverall (Tyvek, Polycoated Tyvek or Saranex)
- Outer gloves: neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots.
- Steel-toed safety boots
- Hard hat

6.2.2 Level C

Level C equipment, used as appropriate, is as follows:

- Full-face, air purifying, cartridge-equipped respirators (NIOSH-approved) utilizing Organic Vapor/Acid Gas and HEPA filters (half-face if approved by SSHO). Cartridges and/or filters must be replaced as needed and, as a minimum, changed weekly
- Disposable coverall (Tyvek, Polycoated Tyvek or Saranex)
- Outer gloves: leather, cotton, neoprene or nitrile
- Inner gloves: latex or nitrile
- Chemical resistant or disposable overboots
- Steel-toed safety boots
- Hard hat
- Safety glasses (if half-mask is utilized)
- Splash guards (worn during high pressure washing activities)

6.2.3 Modified Level D

Modified Level D equipment, used as appropriate, is as follows:

- Disposable coveralls – Tyvek or Polycoated or equivalent for wet work (equipment decontamination) or as required

- Outer gloves – leather, cotton, nitrile as required
- Inner gloves – nitrile surgical with cotton liner (cotton liner optional)
- Boot covers – Tyvek or equivalent
- Outer boots – rubber or latex disposable
- Safety boots
- Hard hat
- Reflective vests
- Safety glasses – with face shield as required

1. SSHO shall determine the need for upgrade or downgrade of PPE levels based on a conservative interpretation of information provided by air monitoring data and other appropriate information.
2. The SSHO's Daily Safety and Inspection log will list protective ensemble(s) in use for each task.

6.2.4 Level D

Level D equipment, used as appropriate, is as follows:

- Work uniform (Long pants and Shirt)
- Reflective vests
- Hard hat
- Steel-toed safety boots (with disposable overboots, as required)
- Safety glasses
- Leather or heavy cloth gloves (as needed)

6.3 Initial Levels of Protection

Based upon the nature of the remedial activities to be performed at the Site, the initial levels of protection to be used are outlined in **Table 6, "Initial Levels of Protection"**. This table lists each work task and the initial level of protection. The initial level of protection is defined as that level in which work commences.

Table 6 - Initial Levels of Protection

Task	CPC	Level of PPE
Mobilization	None	Level D
Site Reconnaissance	Reg. Tyvek	Level D/Level D Modified
Installation of Temporary Fencing	None	Level D
Utility Work	None	Level D
Asbestos Abatement	Reg. Tyvek	Level C
Building Demolition	Reg. Tyvek	Level D Modified/ Level C
Segregate/Stockpile Demolition Debris	Reg. Tyvek	Level D Modified
Excavation of Contaminated Material	Reg. Tyvek	Level D Modified/Level C
Load demolition Debris	Reg. Tyvek	Level D Modified
Dewatering Activities	Reg. Tyvek	Level D Modified

Sampling Activities	Reg. Tyvek	Level D Modified
Backfilling Activities	None	Level D
Site Restoration	None	Level D
Demobilization	None	Level D

Once the need for PPE is established, a careful evaluation of the hazards is necessary so that a selection can be made that minimizes the risk to the user. For chemical situations, knowing the hazard includes being aware of the type of chemical, its physical state (liquid, solid or gas), and its physiological effect (toxic, corrosive, etc.). Knowing the level of exposure is also important when selecting protective clothing and equipment. After the appropriate level of PPE has been determined, the choice of Chemical Protective Clothing (CPC) material must be considered. Among the most important factors in selecting the appropriate CPC is chemical resistance. *Table 6, "Initial Level of Protection"*, identifies the CPC as it relates to each task.

Air monitoring using direct-reading instruments and personal air sampling will be performed to determine if an upgrade or downgrade from initial PPE levels is warranted. All decisions on the level of protection will be based upon a conservative interpretation by the SSHO of the information provided by air monitoring results, environmental results, and other appropriate information.

7.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

This air-monitoring plan will serve to outline procedures to identify and quantify airborne chemical contaminants at the Cornell-Dubilier site. Both real-time monitoring and air sampling will be conducted throughout the duration of the project to establish the maximum levels of personal protection required, as well as to verify that worker exposure levels and respiratory protection are adequate. Additional monitoring will be performed for the protection of the public and the environment. Available site information indicates that the primary concerns with respect to contamination at the site are related to inhalation of particulates. As a result, engineering controls will be utilized to the maximum extent possible to control the production of dusts during the project. Engineering controls may include the use of tarps or coverings, water misting or dust control additives. A portable meteorological station will be installed in conformance with the EPA Ambient Monitoring guidelines for the measurement of wind speed, wind direction ambient air temperature, atmospheric pressure, humidity, solar insulation, and precipitation. The station will be installed in an area relatively free of trees and houses. The station will include a continuous readout temperature gauge and a rainfall gauge and will produce a 24-hour average figure for each parameter so that the weather influences on the air samples can be characterized. In addition, visual wind direction indicators will be established in a central location at each active work area. Meteorological monitoring results will be documented in the daily safety log.

7.1 Real-Time Air Monitoring

7.1.1 Organic Vapor Monitoring

During the remedial activities, organic vapor levels will be monitored initially and every 30 minutes during intrusive activities with a Photo Ionization Detector (PID) set at the appropriate span setting and

equipped with a 10.6 eV probe or equivalent device (a copy of the PID Operator's Manual will be kept on-site). The frequency may increase or decrease based on site conditions. Monitoring for organic vapor concentrations will consist of measurements taken within 10 feet (downwind) of each active work area. Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site. Refer to **Table 8 – "Operational Action Levels"**

7.1.2 Combustible Gases/Carbon Monoxide/Oxygen Levels/Hydrogen Sulfide

A Multi-RAE or equivalent Portable Gas Monitor will be utilized to monitor for explosive, oxygen enriched/deficient atmospheres and concentrations of hydrogen sulfide initially and every 30 minutes during building and slab removal and sub grade work within 10 feet of active work areas and at a minimum of two locations near the site perimeter alternating between the Lehigh Valley RR and Factory Street borders and the Spicer Avenue and Hamilton Boulevard borders. Continuous air monitoring will be performed during utility connection or disconnection activities. A copy of the Operator's Manual will be kept on-site. The Portable Gas Monitor will be utilized for all intrusive activities and activities where the potential for disruption of utilities exists. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site.

7.1.3 Particulate Monitoring

Continuous real-time air monitoring for dust will be performed within 10 feet (downwind) at appropriate areas adjacent to excavation, fill placement and compaction, asbestos removal, and demolition. Air monitoring will be performed at the work area using a MIE, PDR 1000 Personal/Data RAM or equivalent Particulate Monitor. In addition to the monitoring in the work area, readings will be collected at a minimum of two locations near the site perimeter alternating between the Lehigh Valley RR and Factory Street borders and the Spicer Avenue and Hamilton Boulevard borders. Real-time air monitoring equipment calibration will be performed in accordance with the manufacturer's recommendation prior to field use. Calibration information will be recorded on the Daily Air Monitoring Report. Maintenance and calibration procedures for all air monitoring devices will be maintained on site.

7.2 Personal Air Sampling

In addition to the real-time monitoring performed during demolition, excavation and material handling activities, the personal air-monitoring program will provide for the determination of worker's airborne exposure levels to PCBs and Lead. Such a determination will be made from laboratory analysis of air samples collected from workers during an 8-hour work shift. The selection of the worker to be monitored for daily exposure will be done by the SSHO based on his professional judgment of the characteristics of the job and locations in each work area. Personal sampling will be conducted in a manner representative of exposure of workers at those locations or jobs where the potential for maximum exposure is predicted. Personal air monitoring results will be used to verify personnel exposure during the remedial project. Refer to **Table 7 – "Personal Air Monitoring"**

Table 7- Personal Air Monitoring

Contaminant	Task/Activity	Type of Sample	Sampling Method	Analysis Method
Lead	Demolition, Excavation and Material Handling Activities	Breathing Zone	Personal	NIOSH 7105
PCBs	Demolition, Excavation Material Handling Activities	Breathing Zone	Personal	NIOSH 5503

Personnel exposures will be evaluated by sampling in accordance with NIOSH Method 7105 for lead and NIOSH Method 5503 for PCBs using personnel sampling pumps. This method uses small, portable air sampling pumps that are worn by workers. To quantify worker exposures, the samples are collected in the personal breathing zone of workers for a duration of at least 7 hours. The SSHO will designate at least one person per work in an active work area to wear the sampling device. In general, samples will be collected from those workers and site conditions representing the highest potential for exposure. The action level for lead is $25 \mu\text{g}/\text{m}^3$. If a personnel sample exceeds the action level, additional engineering controls will be implemented. If engineering controls cannot reduce airborne concentrations, all workers in that area will be required to utilize Level C protection, including air-purifying respirators.

7.3 Perimeter Air Monitoring

Continuous perimeter air monitoring will be performed daily at a minimum of two locations near the site perimeter alternating between the Lehigh Valley RR and Factory Street borders and the Spicer Avenue and Hamilton Boulevard borders to ensure that remedial activities do not result in excessive airborne particulate emissions from the site.

7.4 Operational Action Levels

A decision-making protocol for an upgrade in levels of protection and/or withdrawal of personnel from an area based on atmospheric hazards is outlined in *Table 8 – “Operational Action Levels”*.

Table 8 - Operational Action Levels

Active Work Area		
Type of Measurement	Concentration	Action
Total Particulate	Less than $2.5 \text{ mg}/\text{m}^3$	Continue work with air monitoring.
	Greater than $2.5 \text{ mg}/\text{m}^3$	Upgrade to Level C PPE, initiate dust control measures.
Lead in air	Greater than $25 \mu\text{g}/\text{m}^3$	Upgrade to Level C PPE, initiate dust control measures.
Total VOCs (Organic Vapors)	Less than 5 ppm above background	Continue work with air monitoring.

	Greater than 5 ppm above background sustained for 15 minutes	Upgrade to Level C PPE
	Greater than 15 ppm above background for any period of time	Upgrade to Level C PPE
	Greater than 250 ppm above background for any for any two successive readings within a 15-minute period	Stop work, evacuate personnel upwind, notify Contracting Officer's Representative
Combustible gas in air	> 10% LEL but < 25% LEL	Stop work; Ventilate workplace
	> 25% LEL	Stop work; Vacate area & investigate source
Oxygen in air	Less than 19.5%	Stop work; Ventilate workplace
	Greater than 22%	Stop work; Ventilate workplace

Site Perimeter		
Type of Measurement	Concentration	Action
Total Particulate	Greater than 150 $\mu\text{g}/\text{m}^3$	Stop work and initiate dust control measures. Resume work when Total Particulate measurement is below 150 $\mu\text{g}/\text{m}^3$
Total VOCs (Organic Vapors)	Greater than 2.5 ppm above background	Evacuate area; Initiate vapor control
Combustible gas in air	> 10% LEL	Stop work; Evacuate area & investigate source
Oxygen in air	Less than 19.5%	Evacuate area
	Greater than 22%	Evacuate area

8.0 ACCIDENT PREVENTION PROCEDURES/PRACTICES

8.1 Medical and First Aid Requirements

Applicable Standards:

OSHA 29 CFR 1926.23, & 1926.50

USACE EM 385-1-1 Section 3 – Medical and First Aid Requirements

First-aid kits/stations and required contents are maintained in a serviceable condition. Unit-type kits have all items in the first-aid kit individually wrapped, sealed, and packaged in comparable sized packages. First-aid stations will be located as close as practicable to the highest concentration of personnel. First-aid stations will be well-marked and available to personnel during all working hours. First-aid stations will be equipped with a first-aid kit, the size of which will be dependent upon the number of personnel normally employed at the work site.

Emergency telephone numbers and Route to the Area Hospital will be clearly posted and easily visible at all times. There should be OSHA posters prominently displayed and warning signs posted for any known or potential hazard(s) present. MSDSs must be available on the job site at all times.

8.2 Hazardous Substances

Applicable Standards:

OSHA 29 CFR 1926.53 & 1910.1200

USACE EM 385-1-1 Section 6 – Hazardous Substance, Agents & Environments

When hazardous substances are used in the workplace, the hazard communication program dealing with MSDSs, labeling, and employee training will be in operation. MSDS materials will be readily available for each hazardous substance used. A training program, plus regular question and answer sessions on dealing with hazardous materials will be given to keep employees informed. The program will include an explanation of what an MSDS is and how to use and obtain one; MSDS contents for each hazardous substance or class of substances; explanation of the "Right to Know"; identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area; the health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used; as well as informing them of hazards of non-routine tasks and unlabeled pipes.

8.3 Fall Protection

Applicable Standards:

OSHA 29 CFR 1926.500, 501, 502, 503; 1926.106

USACE EM 385-1-1 Section 21 - Safe Access And Fall Protection

To access high and low places on jobsites a variety of equipment may be used such as ladders, scaffolding, suspended platforms, aerial lifts, stairways, and climbing lines. The use of these access systems often presents fall hazards. In addition, employees may be exposed to falls while working on elevated structures, climbing onto and off of equipment, and even while walking by falling through holes or by slipping or tripping.

To protect employees when they are exposed to fall hazards, some form of fall protection must be used. The most common forms of fall protection are guardrails, personal fall arrest systems, hole covers, and safety nets. Any one, or all of these forms of fall protection may be used on construction worksites. The current OSHA standards also require that employees receive training regarding fall protection issues, and that the training is documented. An alternate fall arrest program may be implemented in cases where none of the traditional methods of fall protection are feasible. Components of our fall protection plans are listed below:

Personal Fall Arrest System - The three main parts of a personal fall arrest system are the body belt or harness, the lanyard/lifeline, and a suitable anchorage. Particular attention must be paid to the anchorage point(s) to ensure that they are capable of supporting 5,000 lb. (22.2 kN) or two times the maximum load on an engineered system.

Guardrail Systems - Guardrail systems consist of a toprail, midrail, and if necessary a toeboard. Guardrail systems can be made of various materials, and they must be capable of supporting a 200-pound force.

Training - All employees must receive training on the nature of the fall hazards at the site and on how to avoid falls. Employees should be familiar with the use of all personal fall arrest systems and must wear the equipment when necessary.

The requirements of all applicable OSHA regulations notwithstanding, the minimum fall protection requirements on our projects may include the following:

- All fall protection systems must meet the requirements of Part 1926, Subpart M.
- For situations where lifelines are interrupted, double lanyards are necessary to ensure that the worker is continuously protected from falling by attaching one lanyard ahead of the discontinuity prior to unhooking the trailing lanyard.
- Climbing on forms, false work, or the structure to gain access to work areas is expressly prohibited. However, it is not intended to prohibit the use of ladders for access to work areas, provided the operation is in compliance with OSHA Part 1926 Subpart X and other relevant requirements.
- Where scaffolds are necessary to provide temporary access to work areas, they must be in compliance with §1926.451. Scaffolds must include a toprail, midrail, and toeboard in compliance with 1926.451, on all open sides and ends. Personal fall arrest systems meeting the criteria of Part 1926 Subpart M are required to protect workers during installation and removal of the railings, and in situations where physical restrictions preclude installation of a standard railing.
- Fall protection is required for open sides or ends of roofs and for openings in floors, as required in Part 1926 Subpart M. In no case will a height of fall 6 feet (1829 mm) or greater from the side, end, or opening in a floor remain unprotected.
- All workers in approved personnel aerial lifts must use a personal fall arrest system meeting the criteria of Part 1926 Subpart M, with the lanyard attached to the boom or basket, as required by OSHA 1926.556.
- Because falls from structural members constitute a serious and clearly recognizable hazard, fall protection, if necessary, for all steel or concrete beams and other structural elements must be in place prior to removal. This fall protection will consist of personal fall arrest systems, safety nets, or other means meeting the requirements of Part 1926 Subpart M.
- Instances in which it is impossible to provide fall protection for workers are rare. Where an individual worker must rig the fall protection system, and it cannot be accomplished from an aerial lift or by tying-off to the existing structure, momentary exposure to a fall hazard may be unavoidable. It is essential that adequate planning of construction procedures minimize such occurrence of unprotected exposure to fall hazards. It is equally essential that the fall protection systems utilized actually enhance safety, rather than creating a secondary hazard.

8.4 Electrical

Applicable Standards:

OSHA 29 CFR 1926.400 through 449, 1910.301 through 399, 1926.550(a)(15)

USACE EM 385-1-1 Section 21- Electrical

Electricity is a serious workplace hazard that must be respected at all times. It is important to remember that exposure to even a little electric current can kill! The best protection around electricity is distance -- ample distance between the worker and the conductive materials. The following safe work practices and procedures will help prevent electrical accidents on the jobsite.

Workers should observe and strictly obey all warning and danger signs around electrical apparatus. They should never close a switch that has a danger tag on it signed by or placed there by someone else. Untrained people must not open any electrical enclosures. The one exception is that the door on a circuit breaker panel board may be opened to operate the switches, but other types of electrical enclosures should not be opened.

Extension cords or any power tools or equipment must not be used when the cords are frayed, worn out, or the wires are bare. Defective equipment should be reported to the supervisor and turned in for repair. Report all unguarded or broken light bulbs. Do not hang lights by their cords unless the light was designed to be suspended in that manner.

Installation Safety Requirements: Live parts of electrical equipment operating at 50 volts or more must be guarded against accidental contact. Entrance to rooms and other guarded locations containing exposed live parts must be marked with conspicuous warning signs forbidding unqualified persons from entering. All pull boxes and breaker boxes must be labeled to indicate the equipment they switch. Electric installations that exceed 600 volts and that are open to unqualified persons must be made with metal-enclosed equipment or enclosed in a vault or area controlled by a lock. In addition, equipment must be marked with appropriate caution signs.

Conductors and equipment must be protected from over current in accordance with their ability to safely conduct current, and the conductors must have sufficient current carrying capacity to carry the load. Fuses and circuit breakers must also be located or shielded so that employees will not be burned or otherwise injured by their operation.

All wiring components and utilization equipment in hazardous locations must be maintained in a explosion-proof condition without loose or missing screws, gaskets, threaded connections, seals, or other impairments to a tight condition. Unless identified for use in the operating environment, no conductors or equipment can be located:

- In damp or wet locations.
- Where exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect on the conductors or equipment.
- Where exposed to excessive temperatures.

Ground Fault Circuit Interrupters To ensure electrical safety from shocks on all construction sites, all 120-volt, single-phase, 15- and 20-amp receptacle outlets and portable generators must be protected by ground fault circuit interrupters (GFCIs), or assured equipment grounding conductor program must be established. In an assured equipment-grounding program, one or more **competent persons** must be designated to implement and enforce the following assured equipment grounding safety procedures at all construction jobsites.

Each 120-volt extension cord, tool, piece of equipment, and receptacle needs to be inspected and tested before first use, before equipment is returned to service following repairs, and before equipment is used after any incident that can be reasonably suspected to have caused damage.

Each extension cord, tool, or piece of equipment should be visually inspected by the user before each day's use to determine signs of damage. Equipment found to be damaged or defective (frayed or damaged insulation, crushed cable, loose or missing covers or screws, and missing ground prong on plugs, etc.) must not be used until repaired. Equipment suspected to be damaged or defective should be inspected and tested prior to use.

Overhead Transmission and Distribution Lines - A significant hazard on construction jobsites is the accidental contact of moving equipment with live overhead power distribution and service lines. Where work must be done near live lines, the movement of all equipment such as cranes, excavators and other equipment must be guided by an observer who can observe the clearance of the equipment from energized lines and give timely warning to equipment operators. The minimum clearance between live lines and any jobsite equipment is 10 feet (3.0 m), and the clearance increases with increasing line voltages.

8.5 Lockout and Tagout

Applicable Standards:

OSHA 29 CFR 1926.417 & 1910.147

USACE EM 385-1-1 Section 12- Control of Hazardous Energy (Lockout/Tagout)

Whenever maintenance, servicing, or repairs are done to equipment, tools and machinery, there is a potential for injury from the accidental energization or movement of the equipment. Prior to beginning any work on equipment, steps must be taken to identify the energy sources present in the equipment, and to ensure that the energy sources are neutralized.

Hazardous energy sources fall into categories such as electrical, pneumatic, hydraulic, and potential (gravity, springs, etc.). One simple control in the construction industry has been to unplug cord-connected equipment. Vehicles and other motorized equipment can be protected from accidental starting by disconnecting the battery. Other controls include the use of identifiable padlocks on disconnects, breaker switches, and valves. Stored energy has the potential for release with great kinetic force and potential for injury.

All machinery or equipment capable of movement must be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting or setting up operations, whenever required. The lockout procedure requires that stored energy (i.e. mechanical, hydraulic, air) be released or blocked before equipment is locked out for repairs. Appropriate employees are provided with individually keyed personal safety locks. Employees are required to keep personal control of their key(s) while they have safety locks in use. Employees must check the safety of the lockout by attempting a start up after making sure no one is exposed. Where the power disconnecter does not also disconnect the electrical control circuit, the appropriate electrical enclosures must be identified. The control circuit can also be disconnected and locked out.

Temporary electrical service installation will be performed by a qualified electrician. Work may only be performed on de-energized equipment. Lockout/Tagout procedures will be implemented to assure the safety of personnel during electrical work activities.

Underground electric lines will be located and clearly marked. These utilities will be protected, removed, or relocated as needed to do the work safely. The excavation work will not be allowed to endanger the underground utility or the people doing the work. Barricades, shoring, or other supports as needed, will protect utilities left in place that are exposed by the excavation.

8.6 Scaffolds

Applicable Standards:

OSHA 29 CFR 1926.451 through 454

USACE EM 385-1-1 Section 22 – Work Platforms

Use of scaffolds exposes workers to a number of different hazards. According to OSHA, the two predominant hazards when working on scaffolds are falling from the scaffold and being struck by a falling object while working on or below a scaffold. The falls are most commonly caused by either the planking or scaffold support structures giving way, or by falling off the edges of the work platforms. In addition to the fall hazards, workers have been electrocuted when either the scaffold structures or conductive tools and materials being used on the scaffold have come into contact with electrical sources.

In the OSHA standards all scaffolds are divided into two general classes, supported scaffolds or suspension scaffolds. A supported scaffold means, "one or more platforms supported by outrigger beams, brackets, poles, legs, uprights, posts, frames, or similar rigid support." A suspension scaffold is defined as "one or more platforms suspended by ropes or other non-rigid means from an overhead structure(s)."

A key requirement in the OSHA standards is that scaffolds can only be erected, moved, dismantled, or altered under the supervision of a competent person. Such activities can only be performed by experienced and trained employees that are selected by the competent person. Other duties of the competent person include:

- Determining if scaffold components from different manufacturers can be used together.
- Determining if galvanic actions are taking place when scaffolding materials of dissimilar metals are used together.
- Inspecting the inboard connections of outriggers to support structures before using suspension scaffolds.
- Inspecting wire ropes on suspension scaffolds before and after every shift.
- Evaluating how to keep suspension scaffolds from swaying.
- Determining whether and how a safe means of access can be provided to scaffold erectors.
- Determining when the weather is too severe to work on scaffolds.
- Determining when and how fall protection can be provided to employees erecting and dismantling scaffolds.
- Inspecting manila and synthetic ropes used as toprails and midrails for strength requirements as frequently as necessary.

- Providing work skills and safety training to all employees in scaffold work.

The general requirements for all scaffolds are covered in 1926.451. Guidance regarding scaffold capacities, platform construction, access, use, and fall protection are covered in this section. There are also generic criteria for all supported and suspended scaffolds. Some highlights of this section, including the following points:

- Each scaffold and scaffold component must be capable of supporting, without failure, its own weight and at least four times the maximum intended load applied or transmitted to it.
- Each suspension rope, including connecting hardware, used on adjustable suspension scaffolds will be capable of supporting, without failure, at least six times the maximum intended load applied or transmitted to that rope.
- Scaffolds must be designed by a qualified person and will be constructed and loaded in accordance with that design.
- Each platform will be fully planked or decked between the front uprights and the guardrails at the rear of the scaffold. The front edge of all platforms will not be more than 14 in (34.3 cm) from the face of the work, unless employees are provided some form of fall protection. Each end of a platform, unless it is cleated or hooked, must extend over the centerline of its support at least 6 in (15.2 cm) to ensure that the platform does not slip off its support.
- When a supported scaffold height-to-base-width ratio exceeds four to one (4:1), the scaffold must be restrained from tipping by guying, tying, bracing, or equivalent means.
- Supported scaffold poles, legs, posts, frames, and uprights will bear on base plates, mudsills, or other adequate firm foundation. Footings will be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement.
- Suspension scaffold outriggers must securely support the scaffold. Requirements for outrigger connections to the roof or deck, counterweights, outrigger beams, wire ropes, hoists, and other suspension scaffold support devices are given in 1926.451(d).
- When scaffold platforms are more than 2 feet (0.6 m) *above or below* a point of access, portable ladders, hook-on ladders, stair towers (scaffold stairways/towers), stairway-type ladders (such as ladder stands), ramps, walkways, integral prefabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface will be used. Crossbraces will not be used as a means of access.
- Safe means of access for each employee erecting or dismantling a scaffold (using the devices or methods above) must be provided, where the provision of safe access is feasible and does not present a greater hazard. The competent person must determine the feasibility and safety of providing the various means of access.
- Scaffolds will not be moved horizontally while employees are on them, unless the scaffolds have been specifically designed for such movement.
- Scaffolds will not be erected, used, dismantled, altered, or moved such that they or any conductive material handled on them might come closer to exposed and energized power lines than 10 feet (3.0 m) plus 4 in (10.2 cm) for each 1 kilovolt (kv) of line voltage greater than 50 kv. For live insulated lines with less than 300 volts, the minimum distance will be 3 feet (0.9 m). Where possible, electrical lines should be de-energized or moved prior to the erection and use of scaffolds near the lines.
- Ladders will not be used on scaffolds to increase the working level height of employees. Ladders may, under certain circumstances, be used on "large area scaffolds." A large area scaffold is a supported scaffold erected over substantially the entire work area.

- Each employee on a scaffold more than 10 feet (3.0 m) above a lower level will be protected from falling to that lower level. Guardrail and/or personal fall arrest systems must be used as a means of fall protection.
- To the extent feasible and safe, each employee erecting or dismantling a supported scaffold must be provided fall protection. The competent person must determine the feasibility and safety of providing the fall protection during supported scaffold erection. During the deployment of suspension scaffolds, fall protection must also be provided whenever employees are exposed to a fall of 6 feet (1.8 m) or more.
- In addition to wearing hardhats, each employee on a scaffold will be provided with additional protection from falling hand tools, debris, and other small objects through the installation of toeboards, screens, or guardrail systems, or through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects. Alternatively, employees must be kept out of areas where falling objects may strike them.

The scaffold standard requires general training for all employees who perform work while on scaffolds. These employees must be trained by a qualified person, and the training will include information about the nature of the electrical hazards, fall hazards, and falling object hazards associated with working on scaffolds. Additional training must be provided to those employees involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold. This additional training must be provided by a competent person, and will cover the safe means for accomplishing the tasks above. The training must also focus on the need for access provisions and fall protection during scaffold set-up, takedown, and maintenance activities.

8.7 Motor Vehicles and Mechanized Equipment

Applicable Standards:

OSHA 29 CFR 1926.600 through 606, 1926.1000 through 1003

USACE EM 385-1-1 Section 16 – Machinery and Mechanized Equipment

Many potential hazards are associated with the use of motor vehicles and mechanized equipment on construction projects. Motor vehicles may be involved in accidents due to mechanical failures or operator errors, resulting in injuries to operators themselves or to bystanders. To minimize accidents resulting from the use of motor vehicles, the following safety procedures need to be implemented and enforced on all company projects:

- All equipment left unattended at night, adjacent to highways or construction areas should have lights, reflectors, and/or barricades to identify location of the equipment.
- Supervisory personnel will ensure that all machinery and equipment is inspected prior to each use to verify that it is in safe operating condition.
- Rated load capacities and recommended rules of operation must be conspicuously posted on all equipment at the operator's station.
- Wire rope must be taken out of service when one of the following conditions exist:
 - In running ropes, six random distributed broken wires in one lay or three broken wires in one strand or one lay.
 - Wear of one-third the original diameter or outside individual wires.
 - Kinking, crushing, hoist caging, heat damage, or any other damage resulting in distortion of the rope structure.

- In standing ropes, more than two broken wires in one lay in sections beyond connections, or more than one broken wire at an end connection.
- A fire extinguisher of 5 BC rating or higher should be available at all operator stations. Where ordinary combustible materials (wood, paper, plastics) are present, an extinguisher suitable for class A fires should also be available for use.
- When vehicles or mobile equipment are stopped or parked, the parking brake must be set. Equipment on inclines must have the wheels chocked as well as the parking brake set.
- All vehicles or combinations of vehicles must have in operable condition at least:
 - Two headlights.
 - Two taillights.
 - Brake lights.
 - Audible warning device at operator's station.
 - Seat belts properly installed.
 - Appropriate number of seats for occupants.
 - Service, parking, and emergency brake system.
- Operators should not travel in reverse with motor equipment having an obstructed rear view unless:
 - The vehicle is equipped with an audible, functioning reverse signal alarm.
 - The vehicle is backed up only under the guidance of an observer who says that it is safe to do so.
- Only those trained in the use of a specific type of machinery should be allowed to operate the machinery. Operators of heavy equipment and trucks greater than 26,000 lbs (11,794 kg) gross vehicle weight used in traffic must have a commercial drivers license.
- Materials handling equipment such as scrapers, front-end loaders, dozers, and similar equipment must be provided with Rollover Protective Structures (ROPS).
- Accessible areas within the swing radius of cranes, backhoes, and other rotating machinery need to be barricaded to prevent employees from being struck or crushed by the rotating parts of the machinery or their loads.
- Employees should not ride on or in motor vehicles unless seats with seat belts are provided.

8.8 Hand and Power Tools

Applicable Standards:

OSHA 29 CFR 1926.300 through 307

USACE EM 385-1-1 Section 13 – Hand and Power Tools

Tools are such a common part of construction work that it is difficult to remember that they may pose hazards. Workers must learn to recognize the hazards associated with the different types of tools and the safety precautions necessary to prevent injuries from those hazards. To prevent accidents resulting from the use of hand- and power-operated hand tools, management personnel need to implement and enforce the following safe work procedures on all construction jobsites.

Broken, defective, burned, or mushroomed tools should not be used. They should be reported and turned in for replacement. The proper tool and equipment should be selected and used for each task. For example, a wrench should not be used as a hammer or a screwdriver as a chisel. Leaving tools on scaffolds, ladders, or any overhead working surfaces is hazardous because they may fall. Racks, bins, hooks, or other suitable storage space must be provided to permit convenient arrangement of tools.

Striking two hardened steel surfaces together is hazardous because pieces of metal may break off (i.e., two hammers, or a hammer and hardened steel shafts should not be struck together). The practice of throwing tools from one location to another, from one employee to another, or dropping them to lower levels will be prohibited. When it is necessary to pass tools or material under the above conditions, suitable containers and/or ropes must be used.

Wooden tool handles must be sound, smooth, in good condition and securely fastened to the tool. Sharp-edged or pointed tools should never be carried in employee's pockets. Only non-sparking tools will be used in locations where sources of ignition may cause a fire or explosion. Tools requiring heat-treating should be tempered, formed, dressed, and sharpened by workmen experienced in these operations. Tools designed to accommodate guards must be equipped with such guards when in use.

All rotating, reciprocating or moving parts of equipment (belts, gears, shafts, flywheels, etc.) must be guarded to prevent contact by employees using such equipment. Guarding must meet requirements set forth in ANSI B15.1-1953. All hand-held power tools (e.g., circular saws, chain saws, and percussion tools) without a positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when pressure is released. A positive "on-off" control must be provided on platen sanders, grinders with wheels 2 inches in diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks $\frac{1}{4}$ in wide or less.

A momentary contact "on-off" control must be provided on all hand-held powered drills, tapers, fasteners drivers, horizontal, vertical and angle grinders with wheels greater than 2 inches in diameter. Besides safety hazards, the use of power tools sometimes creates potential health hazards as well. The use of jackhammer and chiseling equipment often results in silica and nuisance dust exposures that can sometimes be controlled by wetting the work surfaces. Many times, however, the use of dust/mist respirators is required to prevent overexposures.

In addition to dust hazards, the hand vibration inherent in the use of some power tools may result in a restriction of blood flow to the hands and fingers, causing numbness or tingling. If workers consistently experience these symptoms after the use of power tools, they should contact their supervisor so that steps may be taken to prevent further harm to the nerves and blood vessels in their hands. The use of a different tool, changes to the offending tool to reduce vibrations, and/or the use of special gloves may be recommended to deal with the vibration problems.

Electric Tools - Electric tools present several dangers to the user; the most serious is the possibility of electrocution. The following safe work procedures for electric tools must be implemented and enforced at all company construction projects. Tools must (1) have a three-wire cord with ground and be grounded, or (2) be double insulated, or (3) be powered by a low-voltage isolation transformer. A Ground Fault Circuit Interrupter (GFCI) must be used or the tool must be double insulated to prevent the worker from electrical shock hazards. Never remove the third prong from the plug. Electric tools should be operated within their design limitations.

In general, gloves and safety footwear are recommended during use of electric tools. However, gloves should not be worn when they are a potential entanglement hazard with reciprocating or rotating tools. When not in use, tools should be stored in a dry place. Electric tools should not be used in damp or wet locations.

Powered Abrasive Wheel Tools - Power abrasive wheel tools present a special safety problem because they may throw off flying fragments. The following safe work procedures for powered abrasive wheel tools need to be implemented and enforced at all company construction projects. Portable grinding tools must be equipped with safety guards to protect workers from flying fragments as well as the moving wheel surface. Inspecting and sound- or ring-testing abrasive wheels prior to mounting is required to ensure that they are free from cracks or defects. Checking to ensure that the abrasive wheel RPM rating is appropriate for the tool will also help prevent wheel failures. The following work rules are appropriate for using a powered grinder:

- Always use eye protection and a face shield.
- Turn off the power when not in use.
- Never clamp a hand-held grinder in a vise.
- To prevent the wheel from cracking, the user should ensure that it fits freely on the spindle.
- Grinding wheel users should never stand directly in front of the wheel during start-up because there is always a possibility that the wheel may disintegrate (explode) when accelerating to full speed.

Pneumatic Tools - Pneumatic tools are powered by compressed air and include chippers, drills, hammers, and sanders. The following safe work procedures for pneumatic tools must be implemented and enforced at all company construction projects. Pneumatic tools that shoot nails, rivets, or staples and operate at pressures more than 100 lbs/in² must be equipped with a special device to keep fasteners from being ejected unless the muzzle is pressed against the work surface. Eye protection is required and face protection recommended for employees working with pneumatic tools.

Hearing protection is required when working with noisy tools such as jackhammers. When using pneumatic tools, users should check to see that the tools are fastened securely to the hose to prevent the hose from becoming disconnected. All hoses exceeding 1/2" inside diameter must have a safety device at the supply source or branch line to reduce pressure in the event of hose failure.

Airless spray guns that atomize paints and fluids at high pressures (1,000 lbs or more per in²) must be equipped with automatic or visual manual safety devices that will prevent pulling the trigger until the safety device is manually released. Workers operating a jackhammer are required to wear safety glasses, safety footwear, and hearing protection. Compressed air guns should never be pointed toward anyone. A safety clip or retainer must be installed to prevent attachments from being unintentionally shot from the barrel of the tool.

Liquid-Fueled Tools - Liquid-fueled tools are usually powered by gasoline. Vapors that can burn or explode and give off dangerous exhaust gases are the most serious hazards associated with liquid-fuel tools. The following safe work procedures for liquid-fueled tools need to be implemented and enforced at all company construction projects.

Gas or fuel should be handled, transported, and stored in approved flammable liquid containers. These containers, also known as safety cans, are no more than 5 gallons in capacity and have a spring-closing lid and spout cover that will safely relieve internal pressure when subjected to fire exposure. Before refilling the tank for a fuel-powered tool, the user must shut down the engine and allow it to cool to prevent accidental ignition of hazardous vapors. Effective ventilation and/or personal protective equipment is necessary when using a fuel-powered tool inside a closed area. Fire extinguishers must be readily available in the work area.

8.9 Fire Protection and Prevention

Applicable Standards:

OSHA 29 CFR 1926.150 through 159

USACE EM 385-1-1 Section - 9 Fire Prevention and Protection

Fire on construction projects is a constant hazard that can cause loss of life, equipment and material. To assist in preventing fires on construction projects, all personnel must comply with the following safe work practices and procedures:

Fire Protection - Access to all available firefighting equipment must be maintained at all times. Firefighting equipment must be inspected monthly and maintained in operating condition. Defective or exhausted equipment must be replaced immediately. All firefighting equipment should be conspicuously located at each jobsite. One fire extinguisher, rated not less than 10A, should be provided for each 3,000 ft² of the protected work-zone area. Travel distance from any point of the protected work-zone area to the nearest fire extinguisher must not exceed 100 feet. Extinguishers exposed to freezing conditions will be protected from freezing. Employees should not remove or tamper with fire extinguishers installed on equipment or vehicles or in other locations unless authorized to do so or in case of fire. After using a fire extinguisher, it must be recharged or replaced with another fully charged extinguisher. Extinguishers must be selected based on the anticipated fire hazards. To aid in the proper selection of fire extinguishers, the classes of fires are as follows:

- Class A (wood, paper, trash) - use water, dry chemical, or foam extinguisher.
- Class B (flammable liquids; gas, oil, paints, grease) - use foam, carbon dioxide, or dry chemical extinguisher.
- Class C (electrical) - use carbon dioxide or dry chemical extinguisher.
- Class D (combustible metals) - use dry powder extinguisher only.

Fire Prevention - Internal combustion engine-powered equipment should be located so that exhausts are away from combustible materials. Smoking is prohibited at all projects. Project will be conspicuously posted, "No Smoking or Open Flame." Portable battery-powered lighting equipment must be approved for the type of hazardous locations encountered. Combustible materials must be piled no higher than 20 feet (6.1 m). Depending on the stability of the material being piled, this height may be reduced.

Portable fire extinguishing equipment, suitable for anticipated fire hazards on the jobsite, must be provided at convenient, conspicuously accessible locations. Firefighting equipment must be kept free from obstacles, equipment, materials, and debris that could delay emergency use of such equipment. Employees should familiarize themselves with the location and use of the project's firefighting equipment. All oily rags, wastes, and similar combustible materials must be placed in metal containers. The containers must be emptied on a daily basis. Storage of flammable substances on equipment or vehicles should be prohibited unless such unit has adequate storage area designed for such use.

Flammable and Combustible Liquids - Explosive liquids, such as gasoline, will not be used as cleaning agents. Gasoline and similar combustible liquids must be stored, transported, and handled in

approved and labeled containers in well-ventilated areas free from heat sources. Approved wooden or metal storage cabinets must be labeled in conspicuous lettering, "Flammable-Keep Fire Away." Storage in an approved storage cabinet should not exceed 60 gallons of flammable, or 120 gallons of combustible liquids. Storage of containers will not exceed 1,100 gallons in any one pile or area. Separate piles or groups of containers by a 5 feet clearance. Never place a pile or group within 20 feet of a building. A 12-foot wide access way must be provided within 200-feet of each container pile to permit approach of fire control apparatus.

The use of flammable liquids and spray finishing needs to conform to the requirements of 1926.66 and 1926.152. Paints and reducers should be stored away from heat sources and out of the sun. Airless spray-painting apparatus should be of a type approved for hazardous locations. Any electrically or fuel-powered equipment used to mix, convey, and spray flammable and combustible liquids must carry an approval from a nationally recognized testing laboratory. Pneumatically operated equipment is usually suitable for use with flammable and combustible finishes.

Fire Extinguishers - Portable fire extinguishers are provided in adequate number and type (10 lb. ABC) and are located throughout the site. Fire extinguishers are located in readily accessible locations. Fire extinguishers are recharged regularly and the date of last inspection noted on their tags. Extinguishers should be placed free from obstructions or blockage. All extinguishers must be fully charged and in their designated places unless in use. All employees are periodically instructed in the use of extinguishers and fire protection procedures. Fire Extinguishers will be located in the following areas:

- **Support Zone (Field):** (1) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- **Decontamination Reduction Zone:** (2) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- **Exclusion Zone:** (1) 10 lb ABC multipurpose dry chemical type fire extinguishers.
- **Equipment:** All of Severson's heavy equipment will be supplied with ABC multipurpose dry chemical type fire extinguishers.

8.10 Sanitation

Applicable Standard:

OSHA 29 CFR 1926.51

USACE EM 385-1-1 Section - 2 Sanitation

Employees should not be required to perform work under unsanitary conditions. Adequate supplies of potable water will be provided at the jobsite. Containers used for drinking water will be clearly marked and not used for any other purpose. Cups must not be shared by employees. Outlets for non-potable water (i.e., firefighting purposes) are not to be used by employees for drinking, washing, or cooking purposes. All construction projects must have an adequate number of toilets on the jobsite. Hand washing facilities need to be provided in near proximity to the jobsite. Hand washing facilities should also be present when employees are applying paints, coatings, herbicides, and insecticides or in other operations where contaminants may be harmful to the employees.

8.11 Confined Space Entry

Applicable Standards:

OSHA 29 CFR 1910.146, 1926.21(b)(6)
USACE EM 385-1-1 Section 6.1 – Confined Space

A confined space is a space that is large enough and so configured that an employee can physically enter and perform assigned work, has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits) and is not designed for continuous employee occupancy. Simply working in a confined space is not necessarily a hazard. However, if certain hazardous conditions exist prior to, or are created during entry, then the confined space must be treated with utmost care.

Conditions that make a confined space especially dangerous (i.e., make it a permit-required space) are:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

A hazardous atmosphere includes spaces that may expose employees to flammable gases, vapors, mists, or dusts; to an oxygen deficiency (<19.5 percent) or oxygen enriched environment (>23.5 percent); to air contaminants in excess of the PEL, or to any other atmospheric condition that is an immediate danger to life and health (IDLH).

When a permit-required space is present, the following hierarchy of controls should be used on the space:

- Avoid entry.
- Eliminate the hazards that make the confined space a permit-required space. Ventilation, lockout/tagout, block and bleed, and other procedures can be used to eliminate hazards. Hazard elimination must be verified by air monitoring and other test procedures.
- Eliminate the hazards to the point that only atmospheric hazards remain. Use the "atmospheric hazard only" procedures entry system discussed in 1910.146(c)(5).
- Minimize and control hazards to the fullest extent possible, and enter only after the requirements of a full permit entry have been satisfied.

Employees must receive training on confined spaces so that they will acquire the understanding, knowledge, and skills necessary for a safe entry into the confined space. Confined space training should be documented.

8.12 Welding and Cutting

Applicable Standards:

OSHA 29 CFR 1926.350 through 354
USACE EM 385-1-1 Section 10 – Welding and Cutting

Welding and cutting operations present various safety and health hazards. Welding and cutting operations on lead-painted surfaces often create lead fumes by "boiling off" the lead. These lead fumes

may cause lead poisoning if inhaled or ingested in excessive amounts. Other metal fumes such as iron oxide, chromium, zinc, manganese, and cadmium may also be present during welding and cutting operations. Safety hazards such as fire may result in fatalities, serious injuries, and/or property damage. Therefore, in an effort to eliminate or reduce the hazards associated with welding and cutting operations, the following rules and procedures should be included and enforced in any welding safety program.

Welding and Cutting - Only qualified welders should be authorized to do welding, heating, or cutting. Inspect work areas for fire hazards and proper ventilation before welding or cutting. Avoid welding or cutting sparks and hot slag. Be alert to hot surfaces and avoid touching metal surfaces until they have cooled. Place compressed gas cylinders in an upright position and secure in place to prevent dropping or falling. Handle with extreme care and do not store near any sources of heat. Remove any combustibles when welding or cutting must be done. If removal is not feasible, cover combustibles with a noncombustible material. When welding near any combustible material, another employee must be posted to serve as a fire watch. Make sure this person has a fire extinguisher available and keep him/her in the area after welding/cutting is completed until all danger of fire is past.

A hot-work permit system may be used at some jobsites, such as welding in permit-required confined spaces containing hazardous materials. When working in the vicinity of welding operations, wear approved eyewear and avoid looking directly at the flash as serious flash burns could result. When opening valves on tanks that have regulators installed, be sure the pressure adjustment screw is all the way out and do not stand in front of the regulator. An internal failure could rupture the regulator and cause the adjustment screw to become a missile.

Primers, paints, and other coatings should be removed, where feasible, from the area to be heated and for at least 4 in on all sides.

Gas Welding and Cutting - When transporting, moving, and storing compressed gas cylinders, always ensure that the valve protection caps are in place and secured. Secure cylinders on a cradle, slingboard, or pallet when hoisting. Never hoist or transport the cylinders by means of magnet or choker slings. Move cylinders by tilting and rolling them on their bottom edges. Do not allow cylinders to be dropped, struck, or come into contact with other cylinders violently. Secure cylinders in an upright (vertical) position when transporting by powered vehicles. Do not hoist cylinders by lifting on the valve protection caps. Do not use bars under valves or valve protection caps to pry cylinders loose when frozen. Use warm, not boiling, water to thaw cylinders loose.

Remove regulators and secure valve protection caps prior to moving cylinders, unless cylinders are firmly secured on a special carrier intended for transport. Close the cylinder valve when work is finished, when cylinders are empty, or when cylinders are moved at any time. Secure compressed gas cylinders in an upright position (vertical) except when cylinders are actually being hoisted or carried. Oxygen cylinders should be stored at least 20 feet from other combustible materials such as acetylene. Alternatively, oxygen and fuel gas cylinders may be separated by a 5 feet-high non-combustible barrier with at least a 30-minute fire resistance rating.

Arc Welding and Cutting - Use only manual electrode holders that are specifically designed for arc welding and cutting. All current-carrying parts passing through the portion of the holder must be fully insulated against the maximum voltage encountered to ground. All arc welding and cutting cables

must be completely insulated, flexible type, and capable of handling the maximum current requirements of the work in progress. Employees should report any defective equipment to their supervisor immediately and refrain from using such equipment. Shield all arc welding and cutting operations, whenever feasible, by noncombustible or flameproof screens to protect employees and other persons working in the vicinity from the direct rays of the arc.

Fire Prevention - Welders should locate the nearest fire extinguisher in their work area in case of a fire emergency. Fire extinguishing equipment must be immediately available in the work area. Never use matches or cigarette lighters to light torches. Use only friction lighters to light torches. Never strike an arc on gas cylinders. Move objects to be welded, cut, or heated to a designated safe location. If the objects cannot be readily moved, then all movable fire hazards in the vicinity must be taken to a safe place or otherwise protected. Fuel lines should have flashback arrestors. Do not weld, cut, or heat where the application of flammable paints or the presence of other flammable compounds, or heavy dust concentrations creates a hazard. Additional employees must be assigned to guard against fire while the actual welding, cutting, or heating is being performed when the operation is such that normal fire prevention precautions are not sufficient. Prior to applying heat to a drum, container, or hollow structure, provide a vent or opening to release any built-up pressure during the application of heat. Never cut, weld, or heat on drums, tanks, process lines, or containers that have contained flammable liquids until they have been purged and cleaned.

8.13 Floor and Wall Openings

Applicable Standards:

OSHA 29 CFR 1926.500 through 503

USACE EM 385-1-1 Section 24 - Floor And Wall Holes And Openings

All floor openings must be guarded by a standard railing and toeboards or cover. Ladderway floor openings or platforms must be guarded by standard railings with toeboards on all exposed sides, except at entrance to opening, where a swinging gate allows passage through the railing. Barricades for warning workers of hazards must be at least 6 feet back from the edge of the hazard and 42 in high. Hole covers must be strong enough to support possible loads and secured in place to prevent slipping. Guard all open-sided floors or platforms 6 feet (1.8 m) or more above the adjacent floor or ground level with a toprail, midrail, and toeboard. Guard all wall openings that have a drop of more than 4 feet (1.2 m), and where the bottom of the opening is less than 3 feet (0.9 m) above the working surface with a toprail, midrail, and toeboard. Do not store materials within 6 feet (1.8 m) of floor openings or the roof.

8.14 Trenching and Excavations

Applicable Standards:

OSHA 29 CFR 1926.650 through 652

USACE EM 385-1-1 Section 25 - Excavation

Trenching and excavation work presents a serious risk to all employees. The greatest risk is the cave-in of a trench or excavation. Cave-in accidents are much more likely to result in worker fatalities than any other excavation-related accidents. Other hazards include contact with buried utilities. Because of the hazards associated with excavation work, the following safe work practices and procedures will be implemented and enforced at all company construction projects:

- Remove or support all surface encumbrances whenever their location creates a hazard to employees.
- Identify underground installation (e.g., sewer, utility, fuel) locations prior to opening an excavation. Contact utility companies or owners to advise on the proposed work and ask for the locations of utility underground installations prior to opening an excavation. Additionally, the New Jersey One Call (Dig Safely) can be contacted at 1-800-272-1000 for assistance in identifying utilities in your area.
- Protect, support, or remove underground installations, as necessary, to safeguard employees working in open excavations.
- Structural ramps used by employees as a means of access or egress from excavations must be designed by a **competent person**.
- Structural ramps for access and egress of equipment must be designed by a **competent person** qualified in structural design.
- All excavations or trenches that are 4 feet (1.2 m) or more in depth must have a stairway, ladder, ramp, or other safe means of access and egress within 25 feet (7.6 m) of travel in any direction.
- The edges of a trench or excavation must be barricaded when the excavation is not readily seen because of plant growth or some other visual barrier.
- No employees are permitted underneath loads handled by lifting or digging equipment.
- A warning system (e.g., barricades, signals, or stop logs) must be used when mobile equipment is operated adjacent to an excavation.
- Testing must be conducted in excavations where oxygen-deficient atmospheres exist or could reasonably be expected to exist before employees are permitted to enter excavations greater than 4 feet (1.2 m) in depth.

Take adequate precautions, such as proper respiratory protection or ventilation, to prevent employee exposure to oxygen-deficient and other hazardous atmospheres. Emergency rescue equipment must be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation.

Never work in excavations where water has accumulated or is accumulating, unless adequate precautions have been taken to protect you against the hazards posed by water accumulation.

A **competent person** must conduct inspections of excavations prior to the start of work and as necessary throughout each shift. Inspections must also be made after every rainstorm. Precautions must be taken before employees enter *a trench of any depth* that shows signs of water accumulation or wall sloughing due to moisture. Preventive precautions include the use of support or shield systems to prevent cave-ins, and the use of water removal pumps.

Trenches 5-feet or more in depth must be shored, benched, or sloped back to an angle of incline required to prevent cave-ins. The angle of incline required varies with differences in the soil type, environmental conditions of exposure, and the application of surcharge loads. Any excavation in unstable soil may require shoring or sloping.

Backfilling and removal of trench boxes or supports will progress together from the bottom of the trench. Jacks, supports, or braces will be released slowly, and in unstable soil, ropes will be used to

pull out the jacks and braces from above and clear of the excavation. All personnel will be clear of the trench.

Materials must be placed 2-feet or more from the edge of the excavation. Precautions must be taken to prevent such materials from falling into the excavation.

8.15 Stairways and Ladders

Applicable Standards:

OSHA 29 CFR 1926.1050 through 1060

USACE EM 385-1-1 Section 21 Safe Access and Fall Protection

Stairways and ladders are a major source of injuries and fatalities among construction workers. Because of the potential hazards involved in using stairways and ladders, the following safety practices and procedures need to be implemented and enforced at all construction projects. Ladders that project into passageways or doorways where they could be struck by personnel, moving equipment, or materials being handled must be secured to prevent accidental displacement or be protected by barricades. Workers should always face the ladder and use both hands when going up and down ladders. Materials and tools should be lowered or raised by a rope or other mechanical means. Hold on to the railing on stairways. The areas around the top and base of ladders must be free of tripping hazards such as loose materials, trash, and electrical cords. The same holds true for the bottom of stairways and on stairway platforms.

Ladders - Ladders must be capable of supporting four times the maximum intended load. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced (not less than 10" nor more than 14"). Do not tie or fasten ladders together to provide longer sections unless they are specifically designed for such use. All stepladders must be equipped with a metal spreader or locking device. Do not paint wooden ladders, except to stencil for identification. Maintain ladders free from oil, grease, and other slipping hazards. Ladders must extend at least 3 feet above the upper landing surface and be secured. The horizontal distance for the base of the ladder should extend 1 foot for every 4 feet in vertical distance. Wood job-made ladders must be used at an angle so that the horizontal distance is one-eighth the working length of the ladder. Do not use ladders on slippery surfaces unless they have been properly secured or provided with slip-resistant feet. Do not move, shift, or extend ladder while occupied. Never stand on the top step of a stepladder.

A competent person on a periodic basis and after any occurrence that could affect their performance must inspect ladders. Ladders with structural defects must be tagged with "Do Not Use" or similar language and withdrawn from service until repaired. Never use a metal ladder when working on electrical equipment or near electrical equipment where contact is possible. Any employee who uses a ladder or stairway must receive training by a **competent person** in the following areas:

- Types of fall hazards.
- Correct procedures for erecting, securing, maintaining, and disassembling fall protection systems.
- Proper construction (man-made), use, placement, and handling.
- Maximum intended load-carrying capacities.
- Requirements contained within 29 CFR 1926 Subpart X.

Stairways - Stairways that are not permanent parts of the structure must have landings of not less than 30 inches in the direction of travel. A platform must be provided where doors or gates open directly on a stairway. Metal pan landings and metal pan treads must be filled in with wood or other materials if they are to be used prior to being finished. Maintain all parts of stairways free from hazardous projections, such as protruding nails. Eliminate slippery conditions on stairways before the stairways are used to reach other levels. Every flight of stairs with four or more risers or rising more than 30 inches must have standard stair railings or standard handrails.

8.16 Materials Handling, Storage, Use, and Disposal

Applicable Standards:

OSHA 29 CFR 1926.250 through 252

USACE EM 385-1-1 Section 14 – Material Handling, Storage, Use and Disposal

In the handling of materials, employees must know the following: There must be safe clearance for equipment through aisles and doorways. Vehicles must be shut off and brakes must be set prior to loading or unloading. Containers of combustibles or flammables, when stacked while being moved, must be separated by dunnage sufficient to provide stability. Trucks and trailers will be secured from movement during loading and unloading operations. Hand trucks must be maintained in safe operating condition. Chutes must be equipped with sideboards of sufficient height to prevent the handled materials from falling off. At the delivery end of rollers or chutes, provisions must be made to brake the movement of the handled materials. Hooks with safety latches or other arrangements will be used when hoisting materials, so that slings or load attachments won't accidentally slip off the hoist hooks. Securing chains, ropes, chokers, or slings must be adequate for the job to be performed. When hoisting material or equipment, provisions must be made to assure no one will be passing under the suspended loads.

Stack, rack, block, interlock, or otherwise secure all materials and supplies to prevent sliding, falling, or collapse. Post the maximum safe load limits for floors within buildings and structures in a conspicuous location. Never exceed the maximum safe load limit. Keep aisles and passageways clear to provide for the free and safe movement of material handling equipment and employees. Use ramps, blocking, or grading when a difference in road or working levels exists to ensure the safe movement of vehicles between the two levels. Do not place material within 6-feet of any hoistway or floor opening inside buildings under construction, nor within 10-feet of an exterior wall that does not extend above the material being stored. Stack bagged materials by stepping back the layers and cross-keying the bags at least every 10 bags high. Do not store materials on scaffolds or runways in excess of supplies needed for immediate operations. Remove all nails from used lumber prior to stacking. Stack lumber on level and solidly supported sills. Do not stack lumber higher than 20-feet (16-feet if handled manually).

Stack and block structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, so as to prevent spreading or tilting. Attach handles or holders to the load to reduce the possibility of pinching or smashing fingers. Unload materials close to the point of final use to avoid unnecessary lifting. Do not stack non-compatible materials in the same pile.

Manual Materials Handling - Employees working alone should not attempt to lift or move a load that is too heavy for one person - get help! When working with materials stored in silos, hoppers, tanks, or

similar storage areas, be aware that confined spaces may exist. Attach handles or holders to the load to reduce the possibility of pinching or smashing fingers. Wear protective gloves and clothing (i.e., aprons), if necessary, when handling loads with sharp or rough edges. When pulling or prying objects, workers should be properly positioned. Riding loads, slings, the ball, crane hook, or other material hoisting equipment is prohibited.

Engineering Controls - Engineering controls should be used, if feasible, to redesign the job so that the lifting task becomes less hazardous. This includes reducing the size or weight of the object lifted, changing the height of a pallet or shelf, or installing a mechanical lifting aid

OSHA standard 1926.251 provides guidance about the limitations and uses of slings used in conjunction with other material handling equipment for the movement of material by hoisting. Slings covered by this standard include those made of alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope, and synthetic web (nylon, polyester, and polypropylene). Some general work practices related to rigging include:

- Rigging equipment must be inspected prior to use on each shift and during its use to ensure that it is safe. Defective rigging equipment will be removed from service.
- Rigging equipment must not be loaded in excess of its recommended safe working load. The standard provides load capacity tables for various types of slings and associated hardware.
- Rigging equipment, when not in use, must be removed from the immediate work area.
- Custom rigging must be marked to indicate the safe working loads and will be proof-tested prior to use to 125 percent of their rated load.

In addition to these general guidelines, the standard has specific requirements related to alloy steel chains, wire rope, natural and synthetic rope, and synthetic webbing. Employees performing rigging work should be adequately trained in the safety and functional aspects of rigging for materials handling operations.

8.17 Signs, Signals, and Barricades

Applicable Standards:

OSHA 29 CFR 1026.200 – 203

DOT Manual on Uniform Traffic Control Devices (MUTCD)

USACE EM 385-1-1 Section 8 - Accident Prevention Signs, Tags, Labels & Signals

The use of signs, signals, and barricades is essential to make employees aware that an immediate or potential hazard exists. Both traffic and health hazards such as airborne lead are examples of hazards on bridge renovation/demolition sites that require signs and other devices. The following sections discuss the primary ways that employees are made aware of hazards in their work areas.

Accident Prevention Signs/Tags - Signs, signals, regulated areas, and barricades must be used on each construction project as appropriate.

Danger Signs are used wherever an immediate hazard (i.e., exposed electrical conductor) exists. The danger signs must have red as the predominant color in the upper panel and a white lower panel for additional sign wording.

Caution Signs are used to warn against potential hazards or to caution against unsafe practices. The caution signs must have yellow as the predominant color with a black upper panel (yellow lettering of "caution" on the upper panel) and a yellow lower panel for additional sign wording.

Exit Signs, when required, should be in legible red $\frac{3}{4}$ " (1.9 cm) stroke letters, not less than 6" (15.2 cm) high, on a white field.

Safety Instruction Signs, when used, must be white with a green upper panel and white lettering to convey the principal message. Any additional wording must be in black lettering on the white background.

Directional Signals must be white with a black panel and a white directional symbol. Any additional wording must be in black lettering on the white background.

Traffic Signs must be posted at points of hazards in all construction areas. All traffic control signs or devices must conform to the DOT MUTCD and ANSI D6.1-1971, *Manual on Uniform Traffic Control Devices for Streets and Highways*.

Accident Prevention Tags are used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc.

Out of Order Tags are used to designate equipment that requires repair or maintenance. Equipment with such a tag may not be used until the tag is removed.

Signaling - Flagmen or other appropriate traffic controls must be provided for operations where signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street. Signaling directions must conform to DOT *Manual on Uniform Traffic Control Devices* (MUTCD) and ANSI D6.1-1971, *Manual on Uniform Traffic Control Devices for Streets and Highways*. Stop/Slow sign paddles must be used by flagmen when hand signaling. Red flags, at least 18 in², may be temporarily used in traffic control. Flagmen are required to wear a red or orange reflective warning vest and a hard hat while flagging. Required signs and symbols must be visible at all times when work is being done, and removed or covered promptly when the hazard no longer exists.

Cones, Barrels, Barricades, and Barriers - Channeling devices such as cones, barrels, or barricades are required for jobsite roadways presenting a hazard to motorized equipment or vehicles. Barriers may also provide a greater degree of work zone protection. Consult traffic control resources such as the DOT MUTCD for guidance on establishing and working in road construction work zones.

8.18 Cranes and Hoists

Applicable Standards:

OSHA 29 CFR 1926.550 - 556

USACE EM 385-1-1 Section 15 - Rigging, 16.C Cranes and Derricks

The target goal of a crane safety program is zero crane accidents. To achieve this goal, the following safe work procedures must be implemented and enforced at all company projects:

- Crane operators are required to comply with crane manufacturer's specifications and limitations applicable to the operation of any and all cranes, derricks, and hoists.
- Rated load limits and recommended operating speeds, special hazard warnings, or instructions must be posted on all equipment.
- Hand signals to crane and derrick operators must conform to the applicable ANSI standard for the type of crane being used.
- A **competent person** who is knowledgeable in proper crane setup and operation activities must inspect all machinery and equipment prior to each use, and during use, to ensure it is in safe operating condition.
- Any defective parts must be repaired or replaced before use.
- A **competent person** who is knowledgeable in crane inspection techniques must perform an annual inspection of the hoisting machinery and provide a copy of the dates and results of inspections for each hoisting machine and piece of equipment to the site superintendent.
- All moving parts or equipment (belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheel, etc.) must be guarded to prevent contact by employees.
- Accessible areas within the swing radius of the rotating superstructure of the crane must be barricaded to prevent an employee from being struck or crushed by the crane.
- Exhaust pipes must be guarded or insulated to prevent contact by employees.
- Windows in cabs must be of safety glass, or equivalent, that introduces no visible distortions.
- Where necessary, a ladder or steps must be provided to allow access to a cab roof.
- Platforms and walkways must have anti-skid surfaces.
- A fire extinguisher of 5ABC rating must be accessible at all operator stations or cabs of equipment. No part of a crane or load is permitted within 10 feet (3.0 m) of electric power lines, except where electrical distribution and transmission lines have been de-energized and visibly grounded. A person will be designated to observe clearance of the equipment and provide timely warning to the crane operator.
- No employee is permitted to work beneath a suspended load.

As part of a crane safety program, site superintendents will develop a working knowledge of the client's requirements for operating construction cranes, derricks, or hoists on project property. Interview prospective crane operators prior to site employment to ascertain competence and qualifications and check the prospective crane operator's past experience with previous employers, if possible. The Superintendent or his designee will conduct daily inspections to observe compliance with established company and client crane and rigging procedures and immediately shut down any crane operations that jeopardize the safety of any jobsite personnel.

8.19 Demolition

Applicable Standards:

OSHA 20 CFR 1926.850 - 860

USACE EM 385-1-1 Section 23 – Demolition

Prior to starting demolition operations, an engineering survey must be performed by a **competent person** to determine the condition of the framing, floors, and walls. In some jurisdictions, the competent person must be a professional engineer. All electric, gas, water, steam, sewer, and other service lines must be shut off, capped, or otherwise controlled. If hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in pipes, tanks, or other equipment on the property, testing and purging must be performed to eliminate the hazard prior to demolition.

Employees should never enter any area that may be adversely affected by demolition operations unless they are needed to perform these operations. During demolition, a **competent person** must make continued inspections as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material.

8.20 Housekeeping

Applicable Standard:

29 CFR 1910.25

USACE EM 385-1-1 Section 14.C Housekeeping

A policy of trash removal and the maintenance of good housekeeping practices should be implemented on all jobsites. The accumulation of construction debris may pose a significant fire hazard in addition to tripping and falling hazards.

Good housekeeping practices are the result of planning and organization. All personnel on the site must work together to maintain a clean worksite. The prompt removal of waste materials will permit a free flow of traffic through the work areas. Daily, or more frequent, inspections will be conducted by the general contractor to verify that the housekeeping controls are in place and being enforced.

Housekeeping activities in themselves may pose health hazards such as exposures to dusts, biological agents, and discarded chemicals. Liquid and solid waste chemicals must be placed in leak-proof containers for proper disposal.

8.21 Asbestos Abatement

Applicable Standard:

29 CFR 1910.1001 and 1926.1101 Asbestos

USACE EM 385-1-1 Section 06.B.05 Asbestos and Lead Abatement Activities

Prior to starting activities where there is an identified asbestos hazard, an Asbestos Hazard Abatement Plan detailing compliance with OSHA and EPA and New Jersey Department of Community Affairs (DCA), and the NJ Department of Environmental Protection (NJDEP) asbestos abatement requirements will be developed and implemented. This plan shall be submitted to and accepted by the USACE Contracting Officer Representative before initiation of work activities.

Where Asbestos Containing Material (ACM) is found, an Asbestos Hazard Abatement Plan will be implemented. The plan will include the removal of ACM and describe procedures and equipment required to protect workers and occupants of the regulated area including personnel and area air

sampling. The plan will also include containment, storage, transportation and disposal of the generated wastes. All Asbestos Abatement work will be subcontracted out to a licensed Asbestos Abatement Contractor.

9.0 SITE CONTROL MEASURES

This section outlines site control measures to be implemented to minimize potential exposure to and accidental spread of hazardous substances during remedial activities. Listed below are the work zones that will be established. The zone boundaries may be modified as necessary as new information becomes available.

9.1 Work Zones

The Site will be divided into Exclusion, Contamination Reduction, and Support Zones. It should be recognized that the Site control zones will be modified continually. A map showing the work zones will be updated daily and posted in the Site office. Refer to the *Temporary Facilities Plan* for zone locations. The SSHO will review the location of work zones at the daily safety briefing.

The SSHO and at least one person who has completed Supervisor's Training will be present at the Site whenever work is performed in the Exclusion Zone or Contamination Reduction Zone. Similarly, at least two First aid/CPR-trained individual will be present at the Site when work is performed in those zones.

9.1.1 Exclusion Zone (EZ)

This zone, commonly known as the Hot Zone, is where there will be direct contact with the potentially contaminated material. PPE will be required in this zone. The SSHO will enforce these requirements. The level of PPE required will be based on hazard, site condition and air monitoring performed. The outer boundary of the Exclusion Zone will be delineated with orange safety fence. Modification to the size and boundary of the Exclusion Zone will be made in the field by the SSHO based on operations and wind direction. The Exclusion Zone may be subdivided into different areas of contamination and different levels of PPE may be assigned based upon the expected type and degree of hazard.

All activities in exclusion zone will be conducted using the "buddy system". This involves a buddy who is able to provide his or her partner with assistance, observe for signs of chemical or heat exposure, check integrity of PPE and go for help when needed.

9.1.2 Contamination Reduction Zone (CRZ)

This zone, commonly known as the Warm Zone, is where workers and equipment will be decontaminated. This will minimize the spread of contaminants from the Exclusion Zone into clean areas. The Contamination Reduction Zone will consist of the area located in front of or next to the exclusion zone so that personnel or equipment exiting the Exclusion Zone can be decontaminated and

doff the PPE. Emergency equipment to be located in this area will include eye wash stations, fire extinguishers, first aid kits and other appropriate equipment. The Contamination Reduction Zones or personal decontamination stations will be established adjacent to the Exclusion Zones. These stations will provide a means for prompt removal of potentially contaminated outer PPE at a location convenient to operations.

9.1.3 Support Zone

This zone, commonly known as the Clean Zone, is considered to be uncontaminated. This area will be used as a storage area for operations equipment and where break and toilet and shower facilities will be located.

9.2 Site Entry and Exit Control Log

All site personnel on this project will undergo safety orientation by the SSHO prior to starting work at the site. This training will include general site safety rules, hazardous locations, personal protective equipment guidelines, and onsite emergency procedures. All site personnel will satisfy the following requirements before initiating work onsite within the Exclusion or Contamination Reduction Zones:

- Receive and pass a physical examination, including certification of ability to wear respiratory protection.
- Receive adequate hazardous waste training according to 29 CFR 1910.120 or 29 CFR 1926.65.
- Receive a briefing on all aspects of the SSHP.
- Are properly dressed, equipped, and trained in accordance with all personal protective guidelines.
- Are thoroughly trained regarding decontamination procedures.
- All personnel performing tasks when respiratory protection is needed will comply with the requirements of this plan

All personnel entering and exiting the Exclusion and Contamination Reduction Zones will sign in and out through the Support Zone. The log will indicate the date and time entering and exiting, the location entered, personal protective equipment utilized and decontamination procedures, refer to **Attachment 3 – Safety and Health Forms for the Site Entry and Exit Log**.

10.0 PERSONAL HYGIENE AND DECONTAMINATION

Decontamination (Decon) is the process of removing or neutralizing potentially harmful contaminants that have accumulated on personnel and equipment in order to reduce the spread of contamination outside the work area. Decontamination is critical to the Safety and Health of Site workers and it protects the community by minimizing the off-site migration of contaminants. One of the most important aspects of controlling contaminated material migration is the prevention of the spread of contamination. Good contamination prevention will minimize employee and public exposure.

All personnel and equipment leaving the Exclusion Zone must be decontaminated in the Contamination Reduction Zone prior to entering the Support Zone. The decontamination process is

composed of a series of steps performed in a specific sequence. The basic concept is that more heavily contaminated items will be decontaminated and removed first, followed by decontamination and removal of inner, less contaminated items.

During remedial activities at the Site, all items taken into the Exclusion Zone must be considered contaminated and must be carefully inspected and/or decontaminated before leaving the Site. All contaminated vehicles, equipment and material will be cleaned and decontaminated to the satisfaction of the SSHO prior to leaving the Site. Decontamination procedures will be posted at every decontamination station throughout the project.

10.1 Personal Decontamination

Personnel exiting the Exclusion Zone during remedial activities at the Site will follow the procedure below.

Decontamination of personnel and equipment will be performed using mild soap and lukewarm water, brushes, and pressures washers as applicable.

As the worker leaves the Exclusion Zone, he places his equipment and tools in the Exclusion Zone or Contamination Reduction Zone. After the worker places his equipment and tools down, gross contamination will be removed from outer clothing and boots. Workers will then remove their outer boots and outer gloves and place them in plastic garbage bag-lined containers.

Once outer gloves are removed, workers will remove all outer garments and place them in plastic garbage bag lined containers. Once workers are fully decontaminated and all garments are removed, workers will remove their respirators (applicable to level C) followed by removal of inner gloves. Used cartridges and inner gloves will be placed into plastic garbage bags.

All decontamination stations will be established on (2) - 6 mil plastic sheets, covered with approximately 2 inches of stone. The stone will be replaced of as often as is deemed appropriate.

The change trailer will be used by the on-site staff for short breaks during the workday. The trailer will have an area for changing, washbasins, and counters. This trailer is considered part of the Support Zone and cannot be entered from the Contamination Reduction Zone unless the individual has completed the outlined decontamination procedures. All equipment will be decontaminated before being brought into the trailer.

10.2 Respirator Decontamination

Respirators are to be decontaminated, cleaned and sanitized before reuse. Cartridges and/or filters must be replaced as needed and, as a minimum, changed daily. The respirators are then cleaned with cleaning and sanitizing solutions, wiped dry and placed into sanitary containers or bags and sealed closed. Before departing the change locker facility, respirators are placed into storage compartments for next day use.

10.3 Equipment Decontamination

Nearly all contractor hardware (not consumable) is considered to be recoverable. As such, they will be decontaminated using the proper equipment, (i.e. brushes, sprayers, detergent and, if necessary, other appropriate solvents). Large heavy equipment will be decontaminated with pressure steam wash as required.

The decontamination area for vehicles and equipment leaving the Exclusion Zone will be located within the Contamination Reduction Zone. Equipment will be decontaminated over 2 layers of 6-mil plastic placed on the ground. Scrapers and brushes will be used to remove gross contamination prior to final decontamination. A pressure steam cleaner will be used for the final cleaning and decontamination of the equipment. The combination of dry removal with the brushes and use of the steam cleaner will minimize the generation of contaminated liquid. All solids and liquids will be collected for disposal. Efforts will be made to minimize soil (even non-contaminated soil) from being tracked off-site. Dirt and mud will be removed from trucks and vehicles leaving the Site to the extent practicable.

10.4 Decontamination Log

A decontamination log will be maintained and will list the equipment name and model number, the equipment I.D. number, the activities the equipment was used for, the method of decontamination, amount of decontamination, date and time of decontamination and names of personnel doing the decontamination. This log will be maintained by the SSHO and included in the Safety and Health Report. Refer to *Attachment 3 – Safety and Health Forms for the Equipment Decontamination Log*.

10.5 Decontamination Residue

Decontamination residue consists of disposable PPE (such as Tyvek, gloves, tape and cartridges) and settled solids. Decontamination residue will be drummed and stored in the Exclusion Zone until subsequent disposal or shipment to a disposal facility.

10.6 Personal Hygiene and Sanitation

Hands and face will be thoroughly washed before eating, smoking, drinking, chewing gum or tobacco.

When possible, avoid contact with contaminated materials.

Temporary support facilities such as wash facilities, eating areas, changing areas, and portable toilets will be located in the Support Zone. This area will remain "clean" and free of contamination.

An adequate supply of potable water will be provided to the employees working at the Site. Clearly labeled potable containers will be used to dispense drinking water. Containers will be cleaned at the beginning of each day. The containers will be equipped with taps to access the water. Clean disposable cups will be provided daily.

Portable toilet facilities will be provided on-site for employees and will be located in the Support Zone.

Eating, drinking, smoking, chewing gum or tobacco, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited during remedial activities except in designated eating or smoking areas outside the Exclusion and Contaminant Reduction Zones. Severson employees, subcontractor employees, and service personnel are required to thoroughly decontaminate themselves prior to entering the Support Zone.

11.0 EMERGENCY CONTINGENCY PLAN

This section describes the emergency response plan that will be implemented by Severson employees to handle emergencies. The nature of the project, the contaminants present and the activities planned for the site are such that there is little potential for an emergency, which would result in a significant release of hazardous substances, and in any way threaten the adjoining community. However, there is always the potential at any construction site for emergency situations to occur which threaten the on-site workers. Possible examples of emergency situations during remedial activities include equipment fires or contact of equipment with overhead power lines. In all of these cases, procedures will be implemented to minimize the possibility of an emergency situation. The procedures outlined below are designed to ensure that the workforce reacts quickly and appropriately to emergency situations, thereby protecting the health and well being of the individual workers. It is expected that modifications may be necessary upon actual site set-up and conditions.

NOTE: In the event of a serious or life threatening emergency the primary consideration is the immediate health of the individual rather than routine contamination controls. Standard contamination control protocols shall not interfere with the prompt medical attention required of a seriously injured worker.

11.1 Pre-Emergency Planning

During the site safety briefings held daily, all employees will be informed of the location of this plan, the procedures outlined in this plan, and the communication systems and evacuation routes to be used during an emergency.

On a continual basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency.

A coordination meeting with local emergency response agencies (fire, police, rescue and medical facility) will be conducted prior to work starting at the site. The site activities and potential hazards that may be encountered by responders will be reviewed during this meeting.

11.2 Personnel Responsibilities

All on-site employees have a role in mitigating an emergency incident. The Project Superintendent has primary responsibility for responding to and directing emergency response operations to correct

emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. He is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The SSHO will assist and advise the Project Superintendent, and will direct any emergency medical responses.

The following is an outline of job titles and corresponding responsibilities during an emergency.

- The Site Superintendent directs emergency response activities and serves as liaison with appropriate Client and Client representative's personnel, subcontractors and tenants at the industrial park. In the event of an emergency the Project Superintendent will be the Incident Commander.
- The SSHO recommends that work be stopped if any operation threatens worker or public health or safety and advises Site Manager of emergency procedures if necessary. Provides emergency medical care on site. Notifies emergency services. The SSHO will assume the responsibility of Incident Commander if the Project superintendent is off-site.

11.3 Evacuation Routes and Procedures

In the event of an emergency that necessitates an evacuation of the site, on-site personnel will be notified by hand-held or mobile two-way radios to leave the area by immediate emergency exit. An alternate method of communication will be the use of a portable air horn sounded in regularly spaced, repeated blasts. The Site Superintendent or his designee will notify by phone or in person the industrial park tenants when an emergency exists requiring their evacuation.

During an evacuation, all non-emergency radio transmissions will cease. The SSHO, in conjunction with the Project Superintendent, will control the scene until the appropriate municipal and state agencies arrive and a site specific Incident Command System (ICS) should be implemented. Since site conditions, (i.e., wind direction, precipitation, and work location), change often, the SSHO will determine the appropriate evacuation procedures.

All personnel will assemble/muster at the Contamination Reduction Zone or Support Zone. Access to the site will be restricted.

11.4 Emergency Decontamination Procedures

Decontamination of an injured or exposed worker will be performed if decontamination does not interfere with essential treatment. The objective is to successfully administer first aid without exposing rescue workers and the victim to contaminants. Project personnel will meet with the local hospital to discuss the possibility of having to treat injured personnel from the site.

If the hazards are low and decontamination can be performed, then a wash, rinse and removal of protective clothing will be performed.

If the hazards are high and decontamination cannot be done, then the following procedures will be performed:

- Wrap the victim in blankets or plastic sheeting to reduce contamination of rescue workers or other personnel.
- Alert emergency and medical personnel to potential contamination. Emergency entry into the exclusion zone will be controlled by the SSHO. The SSHO will determine if the victim can be moved from the exclusion zone. If entrance into the exclusion zone is required, the SSHO will ensure that the emergency workers don the proper PPE.
- If required, arrange to have the SSHO accompany the victim to the hospital if required.

11.5 Medical Treatment/First Aid

The SSHO will be trained in CPR and First Aid and have first aid kits for use in a medical emergency. First Aid Kits will be located in the main support area, Contamination Reduction Zone and at the work activity locations. Eyewash stations will be available at the Contamination Reduction Zone. Eyewash stations will be of the pressurized, 15-minute discharge type. On-site employees have a basic knowledge of first aid and will assist the Site Superintendent and SSHO. Community emergency services (EMS, Fire, and Police) will be notified immediately if their resources are needed on site.

If necessary, the injured or sick party will be taken to Cooper Hospital— Please refer to **Figure 3 – “Route to Hospital Map”** and **Attachment 3–“Safety and Health Forms”**, for directions to the area hospital. Route to the area hospital will be posted and easily visible at all times.

11.6 Emergency Alarms/Notifications and Procedures

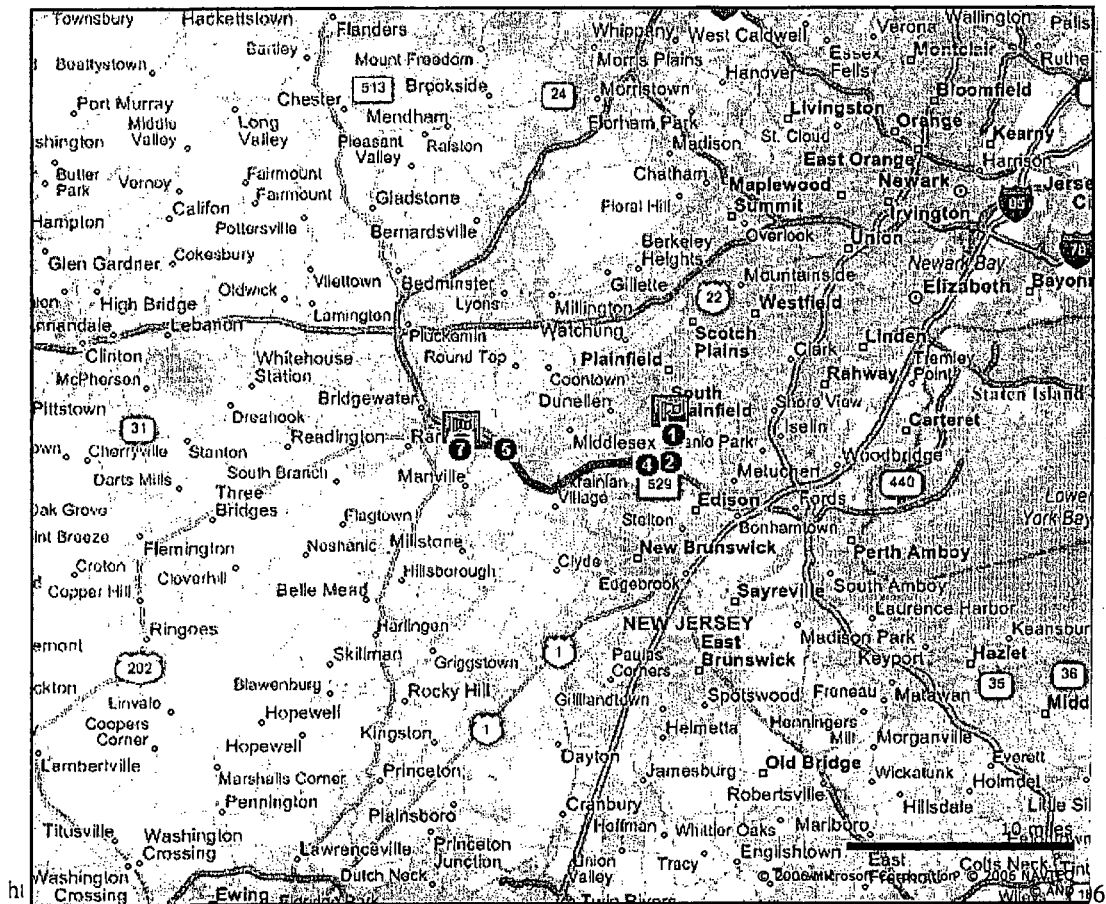
When any emergency occurs on-site the SSHO and Project Superintendent will be notified immediately. The Project Superintendent or the SSHO will notify the client and his representatives. Please refer to the **Table 9 – “Emergency Telephone Numbers”** and **Attachment 3 – “Safety and Health Forms”** for emergency telephones. Emergency Telephones will be posted and easily visible at all times.

To notify any site workers of an emergency, workers can be signaled by way of hand held or mobile two-way radios or as a backup, the use of an emergency alarm (portable air horn). Any audible pattern of blasts from a portable air horn becomes difficult to interpret due to distance and the inhibitory effects of a respirator.

All emergency communications will flow through the radio network. Outside emergency services will be notified, as necessary. The site evacuation alarm consists of one long blast on a horn, every 10 seconds. Any time the alarm system is activated, on site personnel will be notified immediately. Personnel will extinguish any nearby ignition source and prepare for emergency response activities. This alarm will also be used to alert personnel of a sudden release of hazardous materials.

The observer of the emergency condition will brief the responding personnel as to the nature and location of the incident. When they have assessed the situation, a decision whether or not to implement these procedures will be made. If these Emergency Contingency Procedures are not implemented, the "All Clear" will be given verbally by supervisory personnel. The "All Clear" will be used to indicate a return to normal (non-emergency) conditions following emergency response activities. The alarm

signals will be prominently posted at the site. The audible alarm system will be discussed with each resident within hearing range of the alarm system.

Figure 3 - Route to Hospital Map**Direction to Somerset Medical Center – 908-685-2200****Depart Site on Hamilton Boulevard (South- West)**

Bear LEFT (South) onto CR-603 (Hamilton Boulevard)

Turn RIGHT to stay on CR-603 (Hamilton Boulevard)

Turn LEFT (South-East) onto CR-529 (Stelton Road)

Take Ramp (LEFT) onto I-287 towards I-287

At exit 13B, take Ramp (RIGHT) onto SR-28 (Union Avenue) towards RT-28 / Somerville

Turn RIGHT (West) onto Local road(s)

Arrive at Somerset Medical Center (hospital), Somerville, New Jersey**Distance: 12.8 Miles / Time: 18 Minutes**

Table 13 – Emergency Telephone List

South Plainfield Police Department	908-226-7678; 911
South Plainfield Fire Department	908-769-5533; 911
HAZMAT	856-456-9400
Sewage	856-456-0169
Hospital – Somerset Medical Center	908-685-2200
Dr. Greaney – Occupational Specialist (Work Care)	714-456-2154
Sevenson Environmental Services, Inc.	
Laurence A. Elia – Program Manager V.P. Sevenson	716-284-0431
Paul J. Hitcho, PhD, CIH - Safety and Health Manager	716-284-0431(work)/716-998-9797(cell)
Alfred LaGreca - Corporate Project Manager	716-284-0431(work)/716-807-4147(cell)
Kim Lickfield – Project Manager	716-284-0431(work) / 908-769-5301 (site)
Wayne Kostuk - Project Superintendent	908-769-5301
Sam Tavelaris–Safety and Health Officer	908-769-5301
William Zambrana– Project QA/QC officer	908-769-5301
US Army Corps of Engineers	
Neal Kolb- Program Manager	732-846-5830
Patrick Nejand - Contracting Officer Rep	908-769-1601
USEPA, Region II	
New Jersey One Call (Dig Safely)	800-272-1000
NJDEP 24-Hour Hot Line	877-WARNDEP (877-927-6337)
National Response Center	800-424-8802
CHEMTREC	800-424-9300

11.7 Implementation of the Plan

There is a logical sequence of steps to follow in responding to emergencies, which should be followed by site personnel. This sequence involves identifying the emergency, investigating the extent of the emergency, deciding on the proper initial course of action, taking corrective action to rectify the situation, and following up with a post-emergency investigation.

Equipment breakdowns, power failures, injuries, and natural disasters are usually rather dramatic and will capture the individual's attention immediately upon occurrence. In other cases, the individual may have prior warning of impending emergencies through weather reports in the case of natural disasters and trends in equipment performance in the case of some breakdowns.

Some emergency situations exist long before the operator is aware that an emergency exists. These cases may produce situations, which then become immediate and obvious. For example, unattended equipment may have minor breakdowns which go unnoticed; further operation thus leading to complete breakdown of the equipment resulting in possible injury to the unwary bystander.

In the event of a fire, explosion, accidental material release, or any other emergency, response activities will be initiated following the evaluation of the event. An assessment of the situation will be performed by the SSHO immediately upon notification. The Superintendent/SSHO is authorized to commit

resources to the extent detailed in this plan. If it is determined that an emergency situation exists, he will then implement the appropriate emergency response activities.

In the event that a medical emergency or accident occurs in the Exclusion Zone, all personnel responding to the emergency should be outfitted in the Personal Protective Equipment appropriate for the situation. As a general rule, personnel should not enter the Exclusion Zone without donning the minimal level of PPE required. In the event that a worker is overcome or disabled for an unknown reason, the Superintendent/SSHO must make a determination as to the level of respiratory protection, which is appropriate. Specifically, a determination must be made as to whether Supplied Air Respirators are necessary for the protection of the responders.

11.7.1 Conditions for Implementation

The contingency plan will be activated by the Superintendent/SSHO immediately in the event of a fire or explosion, or emissions of toxic chemicals in excess of limits set forth by Federal, State, and local agencies. In the event of a spill or material release, it will be up to the Superintendent/SSHO to make a determination as to when emergency conditions exist, as opposed to routine maintenance of the site. His determination will depend upon the location of the spill, the size of the spill, weather conditions and the proximity of the release to workers, the community and environmental receptors.

Once it becomes apparent that an emergency situation exists or that a disaster is impending, the Project Superintendent or his designee should immediately be notified and an immediate investigation conducted. Assessment of the emergency should include assessing the severity of the situation and collecting enough information to make an initial action decision.

Assessing the emergency should include identifying injured persons (if any), damage to buildings and equipment, noting potential impending damage if corrective action is not taken immediately, and itemizing resources required to correct the situation.

11.7.1.1 Fire or Explosion

Although the potential for fire or explosion is minimal, sources of risk do exist. These sources include welding gases, gasoline for portable equipment, diesel fuel for the heavy equipment and combustible debris. In the event of an explosion, possible emergency conditions would exist. Unless extinguished immediately, a fire or explosion will trigger implementation of these procedures.

11.7.1.2 Material Spills

Material Spills could occur during truck loading and from vehicle accidents. Additionally, equipment fueling operations could produce spills. Ultimately, a spill could contaminate receiving surface water or cause a release of vapors to the air. A spill of fuel could also ignite. A small spill should be cleaned up immediately, but should not trigger activation of these procedures. Should an on site spill occur, the immediate response will include closing off the source of the spill, if possible, application of the sorbent material or sand bagging, and street sweeping, as appropriate. Any spill that results in a discharge to off site surface water will be contained with sorbent booms as needed. All spills will be

investigated, and a written report will be provided to the regulatory agencies in accordance with applicable regulations.

11.7.1.3 Severe Weather

In the event of severe weather, the Site Superintendent and/or the SSHO have the authority to stop operations and direct evacuation procedures, if conditions warrant. All equipment will be secured and grounded. After the storm, a visual inspection will be performed by the Superintendent and/or the SSHO to check for damage and hazards. These will be performed before any work is resumed. If damage or hazards are noted, the designated or other Severson personnel will evaluate the conditions and implement corrective actions to repair the damage or eliminate the hazard. These actions will begin as soon as possible and will take precedence over other site activities.

11.7.2 Initial Action

Once the extent of the emergency is known, the Superintendent and the SSHO will make an immediate decision as to what initial steps should be taken to remedy the emergency situation. This first action, in the case of large-scale emergencies, usually consists of notifying responsible authorities and/or calling for the necessary assistance in order of priority.

The individual(s) should not unduly endanger him or herself or others by attempting tasks for which the proper equipment is not available or with which he or she is unfamiliar. In all cases, if in doubt, wait until qualified help arrives before taking action.

11.7.3 Corrective Action

When help arrives, the site superintendent/SSHO should immediately inform those called of the pertinent details of the situation. Corrective action should be continued until the situation is either under control or completely rectified. If corrective actions will take considerable time, a long-term effort to complete the task should be developed.

11.7.4 Follow-through

After the situation is corrected, the cause of the emergency event is to be determined and review of the corrective actions taken, etc. In the case of equipment failure, if negligence was not a factor, then revising maintenance procedures would be the most likely first preventive step. For natural disasters that cannot be prevented from recurring, the procedures followed in dealing with them can be reviewed to develop more effective action plans. The entire event, along with all of the responses, will be thoroughly documented for review by management and project supervisory personnel.

11.8 Spill Response and Control Plan

The purpose of this section is to define practices and procedures for the prevention, containment, and cleanup of accidental discharges of hazardous substances during the project. This section will compliment the Spill Control Plan; refer to the Remedial Action Work Plan, Appendix C. These

substances include both the contaminated material managed as a result of the remedial project, such as contaminated soils and decontamination liquids, and construction materials typically found on any construction site, such as lubricating fluids, diesel fuel, gasoline, etc.

Spill prevention applies to all types of spills and can be described as the first and simplest approach to spill control. Human error is a major contributing factor to spills and releases. An awareness of spill consequences, preventive measures, and countermeasures will greatly reduce spill occurrences. A sound prevention program includes careful work practices, constant inspection, and immediate notification and correction of deficiencies. In the event that a spill does occur, proper containment and cleanup procedures must then be followed in order to reduce the effect of the spill.

11.8.1 Prevention

Prevention of unnecessary spills is of first priority. Prevention measures include:

- Operators and drivers will exercise extreme caution when transporting material around the site.
- When removing hoses from machines an appropriate and adequate supply of absorbents will be on hand. A supply of the following absorbents will be kept on-site, oil sorbent booms, rolls and pillows, universal towels and sheets, and vermiculite.
- Hoses will be capped when not connected to their appropriate fitting.
- All containers will be inspected daily for decay. No open container will be exposed to rainfall, snowfall, etc. without being emptied and cleaned of residue.
- All equipment will be inspected for leaks before and after service.
- Storage of material such as fuels, oils, and solvents on-site will be limited to the minimum required. All fluids will be stored in individual fluid containers appropriate and approved for the material. Most of the individual fluids containers will be further secured by storage in large, locked tool and equipment storage containers. Drums or other containers too large to be stored in containers will be stored raised off the ground on a liner and covered by plastic.

11.8.2 Reporting

All spills will be reported immediately to appropriate field and office management personnel. The sequence of reporting will be as follows:

- Notification by workers to the Project Superintendent or SSHO.
- The Project Superintendent or SSHO will immediately notify the Contracting Officer Representative regardless of the size of the spill.
- Severson and the Contracting Officer Representative will jointly determine the nature of the spill, its size, direction of travel, if anyone has been injured as a result of the spill and whether it requires immediate notification to regulatory agencies.
- The Contracting Officer Representative will have primary responsibility for notifying the regulatory agencies. Severson will have follow-up responsibility to verify that the notification is made in a timely manner. A full list of emergency contacts and telephone numbers is included this plan. This list includes Severson personnel, as well as federal, state and local authorities. This list will be posted in all trailers on-site.

- The NJDEP will be notified by Contracting Officer Representative or the SSHO of all spills (regardless of their size); notification will be made to the NJDEP Hot Line.

Upon notification of a spill, all project activity will be immediately suspended and all necessary equipment and personnel will be diverted to spill control and containment. In the event of a spill, and regardless of the size, a Spill Incident Report will be submitted to the Contracting Officer Representative with a copy to the USEPA within 48 hours of the incident.

11.8.3 Spill Response Equipment

Given the nature of this project, all the necessary equipment and personnel necessary to deal with a release of hazardous substances will be available on site. In addition to the heavy equipment and personal protective equipment, which is critical to spill control, Severson will have on hand an ample amount of sorbent materials, UN1A2 open top drums and overpacks.

11.8.4 Confinement and Containment

Prior to entering a spill area, all workers must be protected from any adverse effects of the spilled material. No one will enter any spill area alone. The SSHO will determine the level of protection required for response activities. To the extent practicable, the area will immediately be cordoned off and, if appropriate, exclusion, contamination reduction, and support zones will be established.

The decision to use confinement techniques such as diversion, diking and retention, are generally based on time, personnel, equipment, and supplies. As mentioned above, all necessary resources will be available on-site at all times. To the extent the nature of the material is known, the decision should be made based upon a review of the harmful effects of the material. In the event of a large migrating spill, an unlikely circumstance, diversion techniques, such as placing a soil wall or absorbent boom ahead of the spill, will be implemented first. Subsequently, diking techniques, such as using material such as sand covered with liner material (PVC, hypalon) should be implemented.

11.8.5 Cleanup

Once a spill has been contained and the source of the spill corrected and controlled, cleanup can begin. Spill cleanup can proceed at the same time as containment if feasible. Supervisory personnel will determine the appropriate cleanup methods. The SSHO will determine the appropriate level of protection depending upon the nature of the material.

- The first action will be to absorb free liquids with absorbent pads, booms, pillows, or clay. The absorbent material will be placed in drums and moved to an appropriate storage location. Subsequent to the removal of free liquids, soil believed to be contaminated will be excavated and containerized in drums or stockpiled on poly sheeting and covered for further testing.
- Dry spills, while posing less of a risk of migration, will still require appropriate and immediate action. The nature of the spilled material will be ascertained. The spilled material will be recovered for reuse if appropriate. Material which cannot be recovered, and residual contaminated soil will

be shoveled into 55-gallon drums, placed in the drum storage area, and sampled and analyzed for waste characterization and disposal.

- Once containerized, Severson Environmental will provide for the appropriate sampling and analysis for waste characterization and disposal facility acceptance. Results of waste characterization analysis, waste profiles, and manifests will be provided to the Construction Representative for review.
- All spilled material and visually contaminated soil will be excavated and containerized in the initial spill response. If there appears to be a possibility that contaminants have migrated into the surrounding soil, post-remedial sampling will be initiated. Soil samples will be taken from the areas of suspected contamination and analyzed for the compounds, which were released.
- NJDEP requires the immediate notification for spills (regardless of their size) to the NJDEP Hot Line.

Personnel Decontamination - In general, all spill response operations will be performed in accordance with the provisions of the approved SSHP.

11.9 Report/Review

A written report will be made within 24 hours of incident resolution. The Contracting Officer Representative will be provided with a copy. In addition, all key personnel will have a meeting within 48 hours of the incident to discuss and critique all of the aspects of the Emergency Contingency Plan according to new site conditions and lessons learned.

12.0 INSPECTION AND REPORTING

12.1 Safety and Health Inspections

Safety and Health inspections will be conducted to discover, through specific, methodical auditing, checking, or inspection procedures, conditions and work practice that lead to job accidents and illnesses.

The Health and Safety Manager shall be responsible for ensuring that inspections are conducted at the frequency stated, reviewing the Daily Safety and Inspection Logs for completeness, thoroughness, and trends; performing monthly project inspections; and training site personnel on proper inspection techniques. The SSHO shall be responsible for ensuring that daily inspections are conducted, reviewing the inspections findings and corrective actions for applicability and thoroughness, and providing the site management personnel with a summary of inspection findings each month.

The SSHO will develop a safety report based on the deficient inspection items noted during the inspection and conveying the deficiencies to the CQCSM via a Non-compliance Identification / Corrective Action (NICA) Report (refer to Appendix H of the Quality Control Plan). The CQCSM will enter the deficiencies in a master deficiency-tracking log. The CQCSM and the SSHO will discuss the existence of the deficiency with the appropriate work force individual(s) responsible for its correction. A corrective plan of action is developed and implemented following USACE approval, if needed. Deficiencies are tracked in accordance with the Quality Control Plan.

12.2 Daily Safety and Inspections Log

The SSHO will insure that all aspects of the SSHP are complied with on a daily basis. Only one warning will be given to individuals not complying with the SSHP. The SSHO has the authority to shut the work down and ban any individual from the Site. If deficiencies are noted, they will be recorded on the Daily Safety and Inspection Log and will be corrected immediately. The Daily Safety and Inspection Log will be attached to the Daily Quality Control Report. The Daily Safety and Inspection Log will include the date, work area, employees present at the work area, PPE and work equipment in each area, specific safety and health issues, and notes and the signature of the preparer. Refer to *Attachment 3 – Safety and Health Forms for the Daily Safety and Inspection Log*.

12.3 Certification of Worker/Visitor Acknowledgment

A Certification of Worker/Visitor Acknowledgment will be submitted to the Contracting Officer prior to initial entry onto the Site. The certification/acknowledgment will include both formal, field and site-specific training received, personal protective equipment supplied and trained in use, and medical certification. Certificates and Medical certification will be kept on file at the site. Refer to *Attachment 3 – Safety and Health Forms for the Certificate of Worker/Visitor Acknowledgement*.

12.4 Incident Reports

Incident reporting will ensure an immediate report on all incident/accidents and provide an effective follow-up for corrective action in order to eliminate unsafe practices and unsafe conditions. An **Incident/Accident Form** must be completed within 24 hours of the Incident/Accident. This report is utilized in the event of injuries, off-site releases, utility breaks, or accidents. Immediately following the incident/accident, the Site Superintendent and the SSHO will initiate an Incident/Accident Investigation. An Accident Report will be completed on ENG Form 3394 and submitted to the Contracting Officer within 2 days. Refer to *Attachment 3 – Safety and Health Forms for the Incident/Accident Form and USACE ENG-3394 Accident Report*.

“Near misses” will be documented by the SSHO and discussed at the morning safety briefings to educate the work force to potentially hazardous operations or practices.

Copies of Severson’s OSHA 300 Log that summarize recordable injuries and lost-time accidents will be submitted to the Contracting Officer monthly. Refer to *Attachment 3 – Safety and Health Forms for the OSHA 300 Log*.

12.5 Daily Air Monitoring Report

The Daily Air Monitoring Report will be prepared by the SSHO. The Report will include all air monitoring data collected including real-time monitoring, personal monitoring within the Exclusion Zone, and perimeter monitoring. Refer to *Attachment 3 – Safety and Health Forms for the Daily Air Monitoring Report*.

12.6 Weekly Safety Meeting/Daily Tool Box Talks

As part of Severson's Corporate Health and Safety Program, a Weekly Safety Meeting is conducted on Monday mornings in conjunction with Daily Toolbox Talks. This safety meeting outlines current industry safety issues and allows for discussion of job-specific issues. In addition, a daily site briefing will be held to discuss current work activities and hazards for the day along with the air monitoring results from the previous day. The SSHO/Superintendent will conduct Daily Tool Box Talks and Weekly Safety Meetings with ALL on-site personnel Refer to ***Attachment 3 – Safety and Health Forms for Daily Toolbox Talks and Weekly Safety Meetings.***

In addition to the daily toolbox talks and the weekly safety meeting, Severson will conduct monthly project management safety meetings. All site management, including sub-contractor personnel, is required to attend. Topics of discussion will include hazards identified and abated during the previous month, any outstanding action, new-tasks-to-be-performed, site concerns etc. The SSHO will submit a synopsis of each meeting including topics covered, safety-related concerns, action items to be addressed, status of previous items, and a signed attendance list.

12.7 Monthly Exposure Report

A Monthly Exposure Report will be prepared by the Safety and Health Manager and submitted to the Contracting Officer Representative. This report will include a compilation of man-hours worked each month for the project (both Severson and subcontractors), the number of accidents, severity, class of accident, and lost time for each month.

12.8 Safety and Health Phase-Out Report

The Safety and Health Phase-Out Report will be submitted within 30 days following completion of the work. The following information will be included:

- Summary of the overall performance of safety and health (accidents or incidents including near misses, unusual events, lessons learned, etc.).
- Final decontamination documentation, including procedures and techniques used to decontaminate equipment, vehicles, and on site.
- Summary of exposure monitoring and air sampling accomplished during the project.

Attachment 1 – Activity Hazard Analysis

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Mobilization/Site Prep**

AHA NUMBER: **001**

Potential Safety/Health Hazard		Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellant. Check skin and clothing for tick periodically throughout the day.
Chemical spill during refueling operations or general equipment maintenance		Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spill to the SSHO.
Contact with sharp objects/material		Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Contact with underground utilities		Check local Mark-out Authority to identify and mark underground utilities. Keep heavy equipment at least 10 feet from power lines. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and are in place.
Electrical shock		Electrical work performed by qualified person. Use GFCI. Inspect and replace damaged electrical cords and tools. Follow lockout/tagout procedures as required. Keep heavy equipment at least 10 feet from power lines.
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Exposure to high noise		Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Fall from different level		Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Handling heavy objects/material		Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Hand injuries from pinch points		Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.
Struck by/against heavy equipment		Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D PPE Hand/Power tools Ladders Trucks	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Site Inspection. Reconnaissance**

AHA NUMBER: **002**

Potential Safety/Health Hazard		Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Contact with sharp objects/material		Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Fall from different level		Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Inhalation/contact with hazardous material		Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Structural collapse		Perform pre-work inspection. Restrict access to building or demolition areas.
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D/D Modified PPE Hand/Power tools Ladders	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **December 5, 2006**

Activity: **Asbestos Abatement**

AHA NUMBER: **003**

Potential Safety/Health Hazard		Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Airborne asbestos		Use wet methods and engineering controls when handling asbestos. Use appropriate PPE during asbestos survey. Restrict access to non-essential personnel. Certified/experienced asbestos inspector. Follow Asbestos Abatement Plan.
Contact with sharp objects/material		Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Fall from different level		Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Inhalation/contact with hazardous material (non-asbestos)		Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Structural collapse		Perform pre-work inspection. Restrict access to building or demolition areas.
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Electrical shock		Electrical work performed by qualified person. Use GFCI. Inspect and replace damaged electrical cords and tools. Follow lockout/tagout procedures as required. Keep heavy equipment at least 10 feet from power lines.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D/D Modified PPE Hand/Power tools Ladders	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training Asbestos Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Building/Structure Demolition**

AHA NUMBER: **004**

Potential Safety/Health Hazard	Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)	Avoid insect nest or likely habitats of snakes and use tick insect repellant. Check skin and clothing for tick periodically throughout the day.
Chemical spill during refueling operations or general equipment maintenance	Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Exposed to vehicle traffic	Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with sharp objects/material	Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Contact with underground utilities	Check local Mark-out Authority to identify and mark underground utilities. Keep heavy equipment at least 10 feet from power lines. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and are in place.
Fall from different level	Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Exposure to high noise	Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures	Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Fire/Explosion	Fires extinguisher inspected and in place. Fire watch during and after hot work procedures. Follow hot work permit procedures. Good housekeeping practices. Ignition sources eliminated or protected.
Flying Debris	Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Inhalation/contact with hazardous material (non-asbestos)	Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Structural collapse	Perform pre-work inspection. Restrict access to building or demolition areas.
Walking/Working surface	Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Handling heavy objects/material	Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Struck by/against heavy equipment	Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Overhead Activities	Check for loose items overhead. Do not walk near or under unstable slopes, equipment or loads. Hard hats worn at all times. Install toe boards on guardrails. Restrict access to area of potential overhead

	hazard. Rigging hardware will be inspected before each use. Stay in view of the operator if possible and be aware of possible equipment movement overhead. Stay out from under suspended loads. Use tag lines as appropriate.	
Welding and cutting	Control and protect cylinders during use (i.e., acetylene torches, etc.). Fire watch during and 30 minutes after hot work. Have fire extinguisher in place. Obtain hot work permit for welding/cutting/grinding/spark producing tasks and follow all requirements on the hot work permit. Use proper gloves and tinted welding masks.	
Hand/Power tools	Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.	
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D/D Modified PPE Hand/Power tools Ladders Excavators/loaders	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use Hot work permit (as required)	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: Cornell-Dubilier Electronics
Superfund Site

Date: November 3, 2006

Activity: Segregate-stockpile and Load Demolition
Material

AHA NUMBER: 005

Potential Safety/Health Hazard	Recommended Controls
Caught in/between moving parts	Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Biological (i.e., Plants, Insects, Snake, and Infectious Material)	Avoid insect nest or likely habitats of snakes and use tick insect repellant. Check skin and clothing for tick periodically throughout the day.
Chemical spill during refueling operations or general equipment maintenance	Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Exposed to vehicle traffic	Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with sharp objects/material	Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Fall from different level	Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Exposure to high noise	Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures	Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Fire/Explosion	Fires extinguisher inspected and in place. Fire watch during and after hot work procedures. Follow hot work permit procedures. Good housekeeping practices. Ignition sources eliminated or protected.
Flying Debris	Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Inhalation/contact with hazardous material	Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Structural collapse	Perform pre-work inspection. Restrict access to building or demolition areas.
Walking/Working surface	Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Handling heavy objects/material	Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Struck by/against heavy equipment	Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Overhead Activities	Check for loose items overhead. Do not walk near or under unstable slopes, equipment or loads. Hard hats worn at all times. Install toe boards on guardrails. Restrict access to area of potential overhead hazard. Rigging hardware will be inspected before each use. Stay in view

	of the operator if possible and be aware of possible equipment movement overhead. Stay out from under suspended loads. Use tag lines as appropriate.	
Welding and cutting	Control and protect cylinders during use (i.e., acetylene torches, etc.). Fire watch during and 30 minutes after hot work. Have fire extinguisher in place. Obtain hot work permit for welding/cutting/grinding/spark producing tasks and follow all requirements on the hot work permit. Use proper gloves and tinted welding masks.	
Hand/Power tools	Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.	
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D/D Modified PPE Hand/Power tools Trucks Excavators/loaders	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use Hot work permit (as required)	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Sampling Activities**

AHA NUMBER: **006**

Potential Safety/Health Hazard		Recommended Controls
Caught in/between moving parts		Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Chemical spill		Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Exposure to high noise		Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Inhalation/contact with hazardous material		Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Handling heavy objects/material		Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Struck by/against heavy equipment		Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D Modified PPE Hand/Power tools Sampling Equipment	Inspect tools/equipment and PPE before use. Daily safety inspection. Calibrate air monitoring instruments before each use	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **December 5, 2006**

Activity: **Utility Work**

AHA NUMBER: **007**

Potential Safety/Health Hazard	Recommended Controls
Caught in/between moving parts	Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Biological (i.e., Plants, Insects, Snake, and Infectious Material)	Avoid insect nest or likely habitats of snakes and use tick insect repellant. Check skin and clothing for tick periodically throughout the day.
Chemical spill during refueling operations or general equipment maintenance	Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Exposed to vehicle traffic	Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with sharp objects/material	Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Fall from different level	Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Exposure to high noise	Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures	Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Fire/Explosion	Fires extinguisher inspected and in place. Fire watch during and after hot work procedures. Follow hot work permit procedures. Good housekeeping practices. Ignition sources eliminated or protected.
Flying Debris	Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Inhalation/contact with hazardous material	Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Structural collapse	Perform pre-work inspection. Restrict access to building or demolition areas.
Walking/Working surface	Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Confined Space Entry	Identify and post all confined spaces that will be encountered during planned activities (Permitted and Non-permitted). Perform air monitoring (LEL, O ₂ , VOC, CO, H ₂ S) and provide local ventilation. Review and implement confined space entry procedures prior to entering any confine space. Wear appropriate level of PPE.
Contact with underground Utilities	Competent person on site during excavation activities. Contact local mark-out authority to identify and mark-out underground utilities. Keep heavy equipment at least 10 feet from power lines. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.
Electrical Shock	Electrical work performed by qualified person. Use GFCI. Inspect and replace damaged electrical cords and tools. Follow lockout/tagout procedures as required. Keep heavy equipment at least 10 feet from power lines.
Handling heavy objects/material	Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Struck by/against heavy equipment	Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Overhead Activities	Check for loose items overhead. Do not walk near or under unstable slopes, equipment or loads. Hard hats worn at all times. Install toe boards on guardrails. Restrict access to area of potential overhead hazard. Rigging hardware will be inspected before each use. Stay in view of the operator if possible and be aware of possible equipment movement

	overhead. Stay out from under suspended loads. Use tag lines as appropriate.	
Oxygen Deficient Atmospheres	Follow confined space entry procedures. Investigate oxygen deficiency. Perform air monitoring and provide local ventilation. Wear appropriate level of personal protection (i.e., Level B).	
Hand/Power tools	Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.	
Excavation Cave In	Barricade open excavations. Be aware of cave in potential. Competent person on site during activity. Contact local mark out. Authority to identify and mark underground utilities. Keep vehicles/equipment at sufficient distance from edge of excavation. Maintain proper slope for soil classification. Maintain spoils two feet from edge of excavation. Perform daily excavation/trench inspection. Provide access/egress to excavation. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.	
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D PPE Hand/Power tools Trucks Excavators/loaders	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use Utility Mark Outs	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training Confined Space Training

ACTIVITY HAZARD ANALYSIS

Project: Cornell-Dubilier Electronics
Superfund Site

Date: December 5, 2006

Activity: Soil Excavation Activities

AHA NUMBER: 008

Potential Safety/Health Hazard	Recommended Controls
Caught in/between moving parts	Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Chemical spill	Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSO.
Contact with sharp objects/material	Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Biological (i.e., Plants, Insects, Snake, and Infectious Material)	Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Exposed to vehicle traffic	Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with underground Utilities	Competent person on site during excavation activities. Contact local mark-out authority to identify and mark-out underground utilities. Keep heavy equipment at least 10 feet from power lines. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.
Electrical Shock	Electrical work performed by qualified person. Use GFCI. Inspect and replace damaged electrical cords and tools. Follow lockout/tagout procedures as required. Keep heavy equipment at least 10 feet from power lines.
Excavation Cave In	Barricade open excavations. Be aware of cave in potential. Competent person on site during activity. Contact local mark out. Authority to identify and mark underground utilities. Keep vehicles/equipment at sufficient distance from edge of excavation. Maintain proper slope for soil classification. Maintain spoils two feet from edge of excavation. Perform daily excavation/trench inspection. Provide access/egress to excavation. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.
Exposure to high noise	Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures	Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Fire/Explosion	Fires extinguisher inspected and in place. Fire watch during and after hot work procedures. Follow hot work permit procedures. Good housekeeping practices. Ignition sources eliminated or protected.
Flying Debris	Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Inhalation/contact with hazardous material	Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Walking/Working surface	Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Confined Space Entry	Identify and post all confined spaces that will be encountered during planned activities (Permitted and Non-permitted). Perform air monitoring (LEL, O ₂ , VOC, CO, H ₂ S) and provide local ventilation. Review and implement confined space entry procedures prior to entering any confined space. Wear appropriate level of PPE.
Handling heavy objects/material	Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Struck by/against heavy equipment	Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are

		required on all heavy equipment.
Overhead Activities		Check for loose items overhead. Do not walk near or under unstable slopes, equipment or loads. Hard hats worn at all times. Install toe boards on guardrails. Restrict access to area of potential overhead hazard. Rigging hardware will be inspected before each use. Stay in view of the operator if possible and be aware of possible equipment movement overhead. Stay out from under suspended loads. Use tag lines as appropriate.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument	Inspect tools/equipment and PPE before use.	40-Hour HAZWOPER Training
Level D PPE	Daily safety inspection.	8-Hour HAZWOPER Training Supervisor (as required)
Hand/Power tools	Inspect PPE before use.	First Aid/CPR Training (as required)
Trucks	Calibrate air monitoring instruments before	Site Specific Training
Excavators/loaders	each use	Confined Space Training
	Utility Mark Outs	

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Dewatering Activities**

AHA NUMBER: **009**

Potential Safety/Health Hazard		Recommended Controls
Caught-in/between moving parts		Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Chemical spill		Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Electrical shock		Electrical work performed by qualified person. Use GFCI. Inspect and replace damaged electrical cords and tools. Follow lockout/tagout procedures as required. Keep heavy equipment at least 10 feet from power lines.
Exposure to high noise		Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Flying Debris		Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Inhalation/contact with hazardous material (non-asbestos)		Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Handling heavy objects/material		Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Fall from different level		Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Struck by/against heavy equipment		Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Modified Level D PPE Hand/Power tools Pumps Frac Tanks	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Temporary Fence Installation**

AHA NUMBER: **010**

Potential Safety/Health Hazard		Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Handling heavy objects/material		Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Hand injuries from wood splinters and impact from hammering		Ensure site personnel utilize appropriate hand protection while handling wooden fence and driving nails.
Equipment Used	Inspection Requirements	Training Requirements
Level D PPE Hand/Power tools	Inspect tools/equipment and PPE before use.	Review Activity Hazard Analysis First Aid/CPR Training (as required) Daily Toolbox Safety Meeting Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Site Backfilling Activities**

AHA NUMBER: **011**

Potential Safety/Health Hazard		Recommended Controls
Caught in/between moving parts		Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Chemical spill		Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Contact with sharp objects/material		Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with underground Utilities		Competent person on site during excavation activities. Contact local mark-out authority to identify and mark-out underground utilities. Keep heavy equipment at least 10 feet from power lines. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.
Excavation Cave In		Barricade open excavations. Be aware of cave in potential. Competent person on site during activity. Contact local mark out. Authority to identify and mark underground utilities. Keep vehicles/equipment at sufficient distance from edge of excavation. Maintain proper slope for soil classification. Maintain spoils two feet from edge of excavation. Perform daily excavation/trench inspection. Provide access/egress to excavation. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.
Exposure to high noise		Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Flying Debris		Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Struck by/against heavy equipment		Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D PPE Hand/Power tools Trucks Compactor/dozer	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use Utility Mark Outs	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **November 3, 2006**

Activity: **Demobilization /Site Restoration**

AHA NUMBER: **012**

Potential Safety/Health Hazard		Recommended Controls
Caught in/between moving parts		Backup alarm on moving/swinging equipment. Identify or post areas where guarding is not feasible. Inspect and ensure all guards are in place. Swing radius of equipment identified and barricaded.
Chemical spill		Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSHO.
Contact with sharp objects/material		Identify and guard sharp/protruding objects (i.e., rebar caps). Use caution and be aware whenever working around sharp objects. Wear appropriate PPE (i.e., gloves).
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellant. Check skin and clothing for tick periodically throughout the day.
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with underground Utilities		Competent person on site during excavation activities. Contact local mark-out authority to identify and mark-out underground utilities. Keep heavy equipment at least 10 feet from power lines. When an unknown hazard has been encountered, work will stop until hazards and controls are identified and in place.
Electrical shock		Electrical work performed by qualified person. Use GFCI. Inspect and replace damaged electrical cords and tools. Follow lockout/tagout procedures as required. Keep heavy equipment at least 10 feet from power lines.
Exposure to high noise		Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Flying Debris		Ensure guards are installed and working on tools/equipment. Initiate dust control measures. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Fall from different level		Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Walking/Working surface		Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Struck by/against heavy equipment		Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Equipment Used	Inspection Requirements	Training Requirements
Level D PPE Hand/Power tools Trucks Compactor/dozer	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Utility Mark Outs	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: Cornell-Dubilier Electronics
Superfund Site

Date: November 3, 2006

Activity: Decontamination Pad Installation

AHA NUMBER: 013

Potential Safety/Health Hazard		Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)		Avoid insect nest or likely habitats of snakes and use tick insect repellant. Check skin and clothing for tick periodically throughout the day.
Exposed to vehicle traffic		Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Exposure to high/low ambient temperatures		Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Hand/Power tools		Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.
Handling heavy objects/material		Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Hand injuries from pinch points		Ensure site personnel utilize appropriate hand protection. Avoid placing hands in tight spaces while moving materials.
Struck by/against heavy equipment		Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest when working around equipment. ROPS are required on all heavy equipment.
Equipment Used	Inspection Requirements	Training Requirements
Level D PPE Hand/Power tools	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use.	Review Activity Hazard Analysis First Aid/CPR Training (as required) Daily Toolbox Safety Meeting Site Specific Training

ACTIVITY HAZARD ANALYSIS

Project: **Cornell-Dubilier Electronics
Superfund Site**

Date: **December 5, 2006**

Activity: **Above Grade Fuel Oil Storage Tank Dismantlement and Removal**

AHA NUMBER: **014**

Potential Safety/Health Hazard	Recommended Controls
Biological (i.e., Plants, Insects, Snake, and Infectious Material)	Avoid insect nest or likely habitats of snakes and use tick insect repellent. Check skin and clothing for tick periodically throughout the day.
Airborne Asbestos	Use wet methods and engineering controls when handling asbestos. Use appropriate PPE during asbestos survey. Restrict access to non-essential personnel. Certified/experienced asbestos inspector. Follow Asbestos Abatement Plan.
Chemical spill during refueling operations or general equipment maintenance	Good housekeeping practices. Maintain spill response equipment. Practice spill prevention at all times. Proper chemical storage. Spill control and countermeasures plan in place for spills encountered during work activities. Report all spills to the SSO.
Exposed to vehicle traffic	Flaggers/spotters assigned where necessary. Use safety reflective vest when working around active traffic.
Contact with sharp objects/material	Use caution and be aware whenever working around sharp objects such as edges of sheared metal and piping. Wear appropriate PPE (i.e., gloves).
Fall from different level	Fall protection equipment required if task >6 feet. Proper ladder placement and selection.
Exposure to high noise	Wear appropriate PPE (i.e., ear plugs/muffs). Instruct personnel on use of hearing protection. Employees on hearing conservation program.
Exposure to high/low ambient temperatures	Discuss signs/symptoms of heat/cold stress. Drink cool/warm liquids as appropriate. Monitor temperature.
Fire/Explosion	Fires extinguisher inspected and in place. Fire watch during and after hot work procedures. Follow hot work permit procedures. Good housekeeping practices. Ignition sources eliminated or protected.
Flying Debris	Ensure guards are installed and working equipment. Wear appropriate PPE (i.e., Safety glasses/goggles/faceshield).
Electrical Shock	Use GFCI. Inspect and replace damaged electrical cords and tools. Keep heavy equipment at least 10 feet from power lines.
Confined Space Entry	Identify and post all confined spaces that will be encountered during planned activities (Permitted and Non-permitted). Perform air monitoring (LEL, O ₂ , VOC, CO, H ₂ S) and provide local ventilation. Review and implement confined space entry procedures prior to entering any confined space. Wear appropriate level of PPE.
Inhalation/contact with hazardous material (non-asbestos)	Ensure site personnel have the appropriate HAZWOPER, medical clearance and Site Specific training. Follow decontamination procedures. Follow emergency contingency procedures. Implement site control areas. Perform real time air monitoring. Wear appropriate PPE for task/activity performed.
Structural collapse	Perform pre-work inspection. Restrict access to fuel tank area.
Walking/Working surface	Good housekeeping practices. Keep walkways and work areas clear of hoses, cords, and clutter. Restrict site to essential personnel. Wear steel toe/composite boots.
Handling heavy objects/material	Use proper lifting techniques. Utilize proper hoisting/material handling techniques and/or equipment. Use buddy system for heavy, awkward loads. Distribute loads evenly.
Struck by/against heavy equipment	Approach equipment within the operators view. Equipment properly secured when not in use. Equipped with backup alarms and seat belts. Flaggers/spotters assigned where necessary. Hand signal by DESIGNATED worker. Inspect equipment regularly. Keep heavy equipment at least 10 feet from power lines. Only qualified employees will be authorized to operate heavy equipment. Restrict pedestrian traffic. Swing radius roped off or guarded. Use safety reflective vest

	when working around equipment. ROPS are required on all heavy equipment.	
Overhead Activities	Check for loose items overhead. Do not walk near or under equipment or loads. Hard hats worn at all times. Restrict access to area of potential overhead hazard. Rigging hardware will be inspected before each use. Stay in view of the operator if possible and be aware of possible equipment movement overhead. Stay out from under suspended loads. Use tag lines as appropriate.	
Welding and cutting	Control and protect cylinders during use (i.e., acetylene torches, etc.). Fire watch during and 30 minutes after hot work. Have fire extinguisher in place. Obtain hot work permit for welding/cutting/grinding/spark producing tasks and follow all requirements on the hot work permit. Use proper gloves and tinted welding masks.	
Hand/Power tools	Ensure personnel are trained on specific tools. Inspect tools before each use. Use correct tool for the job. Make use of all safety devices and ensure they are functioning.	
Equipment Used	Inspection Requirements	Training Requirements
Air monitoring instrument Level D/D Modified PPE Hand/Power tools Ladders Komatsu 300 backhoe with shear attachment	Inspect tools/equipment and PPE before use. Daily safety inspection. Inspect PPE before use. Calibrate air monitoring instruments before each use Hot work permit (as required) Confined Space Permit (as required)	40-Hour HAZWOPER Training 8-Hour HAZWOPER Training Supervisor (as required) First Aid/CPR Training (as required) Site Specific Training Confined Space Training Asbestos Handling Training

Attachment 2 – Chemical Information Sheets

* * * * *
* C H E M I N F O *
* * * * *
* Canadian Centre for Occupational Health and Safety *
* * * * * Issue : 2001-1 (February, 2001) *

*** SECTION 1. CHEMICAL IDENTIFICATION ***

CHEMINFO RECORD NUMBER : 608
CCOHS CHEMICAL NAME : Lead
SYNONYMS :
* Lead flake
* Lead metal
* Plumbum
* Elemental lead
* Plomb
CAS REGISTRY NUMBER : 7439-92-1
RTECS NUMBER(S) : OF7525000
CHEMICAL FAMILY : Lead and compounds / elemental lead / lead metal
MOLECULAR FORMULA : Pb
STRUCTURAL FORMULA : Pb

STATUS :

The CHEMINFO record for this chemical is complete. The full format ("TOTAL") provides a detailed evaluation of health, fire and reactivity hazards, as well as recommendations on topics such as handling and storage, personal protective equipment, accidental release and first aid.

*** SECTION 2. DESCRIPTION ***

APPEARANCE AND ODOUR :

A bluish-white, silvery, gray heavy, ductile, soft metal; tarnishes on exposure to air.(33,34)

ODOUR THRESHOLD :

Probably odourless.

WARNING PROPERTIES :

Information not available for evaluation

COMPOSITION/PURITY :

Commercial lead has a minimum purity of 99.85-99.985% and may contain bismuth, antimony, tin, arsenic, copper, iron, silver and zinc as impurities.(22) It is available as foil, ingot, rod, shot, wire and powder.

USES AND OCCURRENCES :

Lead is used in the manufacture of storage batteries, ammunition, nuclear and X-ray shielding devices, cable coverings in the power and communication industries, lead sheet for roofing, restoration of old buildings and chemically resistant linings, noise control materials, electrical and electronic equipment, motor vehicles and other transportation equipment, and as a bearing metal. It is used in brass and bronze alloys, casting metals, glass making, ceramic glazes, plastic stabilizers and paints, pipes, traps and bends, and other extruded products for building construction, fuel and storage tanks, and process vessels; and in some solders.(1,35,36) Minor uses include products such as wheel weights, yacht keels, ornamental items and stained glass.(36)
The use of lead in gasoline, paints, pigments and coloured inks is restricted or eliminated in many countries.(1)
Lead is a naturally occurring metal found in small amounts in the earth's crust. However, the occurrence of concentrated and easily accessible lead ore deposits is unexpectedly high and these are widely distributed throughout the world. Lead occurs chiefly as the sulfide in galena.(33,35,36)

*** SECTION 3. HAZARDS IDENTIFICATION ***

** EMERGENCY OVERVIEW **

Bluish-white, silvery, gray heavy, ductile, soft metal. Tarnishes on exposure to air. Probably odourless. COMBUSTIBLE DUST. When heated in

air, forms highly toxic **lead** oxide fumes. DANGER OF CUMULATIVE EFFECTS if inhaled or ingested. Symptoms may include headache, fatigue, nausea, abdominal cramps, joint pain, metallic taste in the mouth, vomiting and constipation or bloody diarrhea. Can cause harmful effects to the nervous system. POSSIBLE CANCER HAZARD - may cause cancer, based on animal information. REPRODUCTIVE HAZARD - may cause harmful effects in the unborn child; may have serious adverse effects on the male and female reproductive systems. MUTAGEN - may cause genetic damage.

**** POTENTIAL HEALTH EFFECTS ****

EFFECTS OF SHORT-TERM (ACUTE) EXPOSURE :

INHALATION :

One case report describes moderate exposure to inorganic **lead** while sandblasting **lead**-based paint for twelve-hours. Symptoms included headache, fatigue, nausea, abdominal cramps, and joint pain.(1) Other health effects such as a metallic taste in the mouth, vomiting and constipation or bloody diarrhea might also be expected to occur.(2) Harmful effects due to short-term exposure to inorganic **lead** compounds are rarely seen any more because of strict controls used in workplaces where **lead** exposure might occur.

Lead accumulates in the body and inorganic **lead** compounds are well known to cause significant health effects following long-term (chronic) exposure. If a significant amount of **lead** has accumulated in the body, symptoms of long-term toxicity may develop after what may seem to be a short-term acute exposure.(3) For more information, refer to "Effects of Long-Term (Chronic) Exposure" below.

SKIN CONTACT :

Inorganic **lead** compounds are not known to cause skin irritation and are poorly absorbed through the skin.(1,4)

EYE CONTACT :

There is no relevant human or animal information available. The dusts would probably cause some tearing, blinking and mild, temporary pain as the solid material is rinsed from the eye by tears. Concentrated solutions or high levels of elemental **lead** fumes may also cause irritation.

INGESTION :

Symptoms of ingestion of a very large dose over a short time period may include headache, fatigue, nausea, abdominal cramps, and joint pain. Other health effects such as a metallic taste in the mouth, vomiting and constipation or bloody diarrhea might also be expected to occur.(2)

Reports of effects following short-term ingestion in adults are very rare, particularly now that strict controls are used in workplaces where **lead** exposure might occur.

Cases of ingestion of inorganic **lead** compounds by children are commonly reported. Children are much more susceptible to the effects of **lead** than adults and, therefore, effects observed in children are not necessarily relevant to adults.

EFFECTS OF LONG-TERM (CHRONIC) EXPOSURE :

Long-term health effects of inorganic **lead** compounds, including elemental **lead**, are similar following inhalation or ingestion. Inorganic **lead** compounds are poorly absorbed through the skin.

Blood **lead** levels are often used as a general indicator of how much exposure to **lead** has occurred. As a result, blood **lead** levels are provided in most reports which discuss the potential health effects of exposure to inorganic **lead** compounds, rather than airborne levels. The relationship between airborne **lead** levels and blood **lead** levels is complicated and depends many factors, including other sources of **lead** exposure and individual physical differences. Several studies indicate that an airborne exposure of 0.05 mg/m³ compares to a blood **lead** level of approximately 30-40 micrograms/deciliter (range 20-60 micrograms/deciliter).(6,7) Average blood **lead** levels of adults with no occupational exposure vary widely depending upon factors such as smoking habits, nutritional status, geographic area, and recreational exposures (for example, the use of firearms). In most industrialized countries, blood **lead** levels in adults without occupational exposure are typically less than 20-30 micrograms/deciliter.(8) In this review, blood **lead** levels below 50 micrograms/deciliter are considered to reflect relatively low **lead** exposure; blood **lead** levels of 51-100 micrograms/deciliter reflect moderate

lead exposure, and blood lead levels above 100 micrograms/deciliter would reflect high lead exposure. Many jurisdictions require that workers be monitored more closely or be removed from exposure if their blood lead levels exceed a certain level. Contact your regulatory jurisdictions for information.

Long-term lead toxicity is commonly referred to as "plumbism" and may include effects on the following body systems.

EFFECTS ON THE CENTRAL NERVOUS SYSTEM: Central nervous system (CNS) or brain function has been harmed in workers with long-term, low-level lead exposure.(9) Symptoms typically occur with low to moderate exposure and include forgetfulness, irritability, tiredness, headache, fatigue, impotence, decreased libido (sexual drive), dizziness, and depression. Repeated exposure to moderate to high levels can cause encephalopathy (a progressive degeneration of certain parts of the brain). Early symptoms of encephalopathy include dullness, irritability, poor attention span, headache, muscular tremor, loss of memory and hallucinations. More severe symptoms occur at very high exposures and include delirium, lack of coordination, convulsions, paralysis, coma and death.(1) Repeated exposure to inorganic lead compounds can affect behaviour. Lead smelter workers with long-term exposure to low levels of lead have experienced altered mood states.(10) Effects at moderate exposures include disturbances in hand-eye coordination, reaction times, visual motor performance, and mental performance.(1,11) Disturbances to vision have been observed in workers after months to years of overexposure to inorganic lead compounds. Symptoms range from very slight visual changes to a gradual decrease in vision, with slow recovery or, in some instances, progression to blindness.(5) Changes in hearing ability have also been reported in lead-exposed workers, particularly those with moderate to high exposure.(12)

EFFECTS ON THE PERIPHERAL NERVOUS SYSTEM: Peripheral nerve function (nerves of the arms and legs) has been harmed in workers exposed to low to moderate levels of inorganic lead. Effects were shown to be reversible following a 5- month exposure.(1,6) However, only partial recovery may occur, particularly if lead exposure continues or treatment is not carried out.(2)

Peripheral neuropathy (loss of myelin which insulates the nerves) has been observed following long-term overexposure to inorganic lead compounds. This disorder is often referred to as "lead palsy" and symptoms include weakness of the arms and legs and weakness and paralysis of the wrist, fingers and ankles. Decreased hand dexterity (measured by finger tapping speed) has been reported in workers with low to moderate exposure to inorganic lead.(13,14) Footdrop and wristdrop (an inability to hold the foot or hand extended) commonly occur with higher exposures.(2)

EFFECTS ON THE DIGESTIVE SYSTEM: Effects on the gastrointestinal tract tend to be observed following high exposure to inorganic lead compounds, although they have sometimes been noted in workers with moderate exposure. Symptoms include loss of appetite, inflammation of the stomach walls (gastritis) and colic, with severe abdominal pain, cramps, nausea, vomiting, constipation, anorexia (loss of appetite), weight loss and decreased urination.(1) In severe cases of lead exposure, a deposit of lead occurs in the gums near the base of the teeth. This deposit is visible as a blue-gray line.

EFFECTS ON THE KIDNEYS: Reversible kidney injury has been observed in some workers with repeated low exposure to inorganic lead compounds.(1,4,15) Irreversible kidney damage has been observed following long-term, moderate exposures.(4,16) An increased number of deaths due to kidney disease were observed in smelter and lead production workers with moderate lead exposure.(1,17)

EFFECTS ON THE BLOOD AND HEART: Inorganic lead can cause harmful effects to certain types of blood cells, including reduced hemoglobin production and reduced life span and function of red blood cells. Reduced hemoglobin production has been associated with low-level exposure to inorganic lead in the workplace.(6) Hemoglobin is the molecule responsible for carrying oxygen to body tissues. With moderate exposures, anemia has been observed

in lead- exposed workers. (15)

Low, moderate or high exposures to inorganic lead compounds may increase blood pressure, particularly in men. (1,6,15)

In two studies, electrocardiographic (ECG) abnormalities were observed in workers with moderate exposure to inorganic lead compounds. (1)

EFFECTS ON THE THYROID AND THE IMMUNE SYSTEM: Whether or not long-term exposure to inorganic lead is associated with harmful effects on thyroid and immune system function has not been well studied yet and the available evidence is weak. (1,4,7,16) In one study, firearm instructors with low exposure to inorganic lead had reduced numbers of some types of immune system cells. ~~This observation is a very early indicator of impaired~~ immune response. (18) With moderate levels of exposure, workers had more colds and flu infections, but did not have impaired antibody production. (1)

SKIN SENSITIZATION: Inorganic lead compounds are not known to be skin sensitizers. One case report describes a lead-exposed employee who developed dry, red, itchy skin (dermatitis). Patch testing with elemental lead was negative. This employee and another lead-exposed employee who had developed dermatitis tested positive in patch tests with two lead salts. (19) These reports cannot be evaluated due to insufficient details.

CARCINOGENICITY :

The International Agency for Research on Cancer (IARC) has determined that the evidence for carcinogenicity of inorganic lead compounds to humans is inadequate and have classified these compounds as possibly carcinogenic to humans (Group 2B). (20)

A comprehensive review of more than twenty human studies involving workers exposed to inorganic lead compounds in battery industries, smelters, pigment factories, printing trades and the glass manufacturing industry concluded that there was a significant excess risk of overall cancer (stomach, lung, and bladder cancers), but not cancer of the kidney. (21) The American Conference of Governmental Industrial Hygienists (ACGIH) has designated elemental lead as an A3 (animal carcinogen).

TERATOGENICITY AND EMBRYOTOXICITY :

Inorganic lead exposure during pregnancy has historically been associated with significant harmful effects on pregnancy, including increased miscarriages and stillbirths. (1,4,22) Many of these historical reports involved exposure to very high levels of lead, as well as other environmental, social and lifestyle characteristics which may have caused or contributed to the observed effects. Lead exposure which has not also caused significant toxicity in the mother has not been clearly associated with teratogenic or embryotoxic effects. (7,23-25)

Several non-occupational studies indicate that low to moderate exposure to lead during pregnancy and in early childhood, can produce harmful effects on neurobehavioural development and IQ, a measure of intelligence. (16,26) Reduced birth weight and shorter pregnancy may also be related to low level lead exposure. However, this literature is inconsistent and no firm conclusions can be drawn. (7,23,27)

There is no relevant animal information available for elemental lead. In studies with lead acetate, a closely related inorganic lead compound, neurobehavioural effects have occurred in offspring of rats at oral exposures which did not produce maternal toxicity.

REPRODUCTIVE TOXICITY :

Significant harmful effects have been reported in the male reproductive system following low to moderate exposures. Harmful effects on the female reproductive system have not been clearly demonstrated following low to moderate inorganic lead exposure. Harmful reproductive effects have been reported in both men and women following high level exposures.

Despite limitations in human population studies, the overall literature suggests that low to moderate inorganic lead exposures are associated with significant male reproductive effects, such as low sperm count and abnormal sperm structure and mobility. (4,14,28,29) In Yugoslavia, 101 male workers exposed to low to high levels of inorganic lead had reduced semen volume and density; reduced total, mobile and viable sperm; and increased numbers of abnormal sperm. (17) Another study of 150 male workers with moderate to high, long-term exposure to inorganic lead compounds showed signs of reduced fertility, as measured by reduced viability of spermatozoa, low sperm counts and abnormal sperm structure. (30) Similar effects have been observed in animal studies.

Associations between workplace exposure of the father and an increased rate

of miscarriage or fetal death have also been reported.(31,32) A critical review of the literature which relates these effects directly to the male (that is, through the sperm) indicates the information is limited and incomplete and that published results are conflicting.(7) Therefore, no firm conclusions can be drawn. Historically, these effects have been related to poor hygiene procedures resulting in exposure of a pregnant woman to **lead** which has been carried home on her partner's work clothing. There are historical reports of reduced fertility and menstrual disorders in women with relatively high inorganic **lead** exposures.(7,29) There are no recent human studies which meet current scientific standards. There is no relevant information available for elemental **lead**. Animal studies using **lead** acetate, a closely related chemical, are inconclusive.

MUTAGENICITY :

Several studies have reported positive results (chromosomal aberrations) in the white blood cells of workers with low to moderate inorganic **lead** exposure. Other studies have shown no increase in chromosomal aberrations in workers with similar exposures.(1) In studies with the related chemical, **lead** acetate, positive results have been reported in animals exposed orally.

TOXICOLOGICALLY SYNERGISTIC MATERIALS :

Significantly increased kidney toxicity was reported in rats given the related chemical, **lead** acetate, and selected nitroso- or amide-type chemicals.(20) Nutritional status and exposure to other metals such as calcium, phosphorous, iron, zinc and copper may influence inorganic **lead** absorption and toxicity.(1)

POTENTIAL FOR ACCUMULATION :

Inorganic **lead** compounds are absorbed into the body following inhalation or ingestion. It is estimated that 30-50% of inhaled **lead** and that 5-15% of ingested **lead** is absorbed. The amount of **lead** absorbed is affected by many factors, including particle size (inhalation), as well as age, nutritional status and time of last meal (ingestion). Inorganic **lead** compounds are poorly absorbed through the skin. Once absorbed, inorganic **lead** compounds are distributed throughout the body. They can readily cross the placenta, reaching the unborn child. The majority of absorbed **lead** is excreted in the urine and feces. Small amounts are also excreted in sweat, hair, fingernails and breast milk. Some **lead** is not excreted, but is stored in the bones and accumulates in the body. It can take more than 20 years for half of the inorganic **lead** in the bones to be removed from the body. **Lead** which is released from the bones can cause health effects, even if there is no current exposure to **lead**. In some cases, **lead** can be rapidly released from the bones because of fractures, infections or other stresses on the body.(1,2,4,7,15)

*** SECTION 4. FIRST AID MEASURES ***

INHALATION :

Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If symptoms are experienced, remove source of contamination or have victim move to fresh air. Obtain medical attention.

SKIN CONTACT :

Avoid direct contact. Wear chemical protective clothing, if necessary. Flush with lukewarm, gently flowing water for 5 minutes or until chemical is removed. Obtain medical advice.

EYE CONTACT :

Avoid direct contact. Wear chemical protective gloves, if necessary. Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. Have victim look right and left, and then up and down. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding the eyelid(s) open. If irritation persists, obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye(s).

INGESTION :

NEVER give anything by mouth if the victim is rapidly losing consciousness, is unconscious or is convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water to dilute material in the stomach. If vomiting occurs naturally, rinse mouth and repeat administration of water. Obtain medical attention immediately.

FIRST AID COMMENTS :

All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace. Lead acetate can accumulate in the body and cause significant long-term health effects. Medical advice should be sought following any exposure.

NOTE TO PHYSICIANS :

Many jurisdictions have specific regulations for lead. These regulations may include requirements for medical surveillance programs, including pre-employment and pre-placement examinations, periodic medical examinations, clinical tests, health education and record keeping. Obtain detailed information from the appropriate government agency in relevant jurisdictions.

*** SECTION 5. FIRE FIGHTING MEASURES ***

FLASH POINT :

Not applicable

LOWER FLAMMABLE (EXPLOSIVE) LIMIT (LFL/LEL) :

Airborne powder or dust can ignite and explode. (37-39) The minimum explosible concentration is not available.

UPPER FLAMMABLE (EXPLOSIVE) LIMIT (UFL/UEL) :

Not well defined. (39)

AUTOIGNITION (IGNITION) TEMPERATURE :

Not applicable

EXPLOSION DATA - SENSITIVITY TO MECHANICAL IMPACT :

Not sensitive. Stable material.

EXPLOSION DATA - SENSITIVITY TO STATIC CHARGE :

Lead metal will not accumulate static charge. It has a high electrical conductivity. (35,36) Under certain conditions, airborne lead powder or dust can explode when ignited by an electrostatic spark or other ignition source. (37-39)

COMBUSTION AND THERMAL DECOMPOSITION PRODUCTS :

When heated in air, forms highly toxic lead oxide fumes. (34,35)

FIRE HAZARD COMMENTS :

Lead metal is not combustible but lead powder is a combustible dust. Finely divided lead is pyrophoric and chemically reactive. Under certain conditions, a dust cloud of lead can explode when ignited by a spark or flame. See references 38 and 39 for a list of the main ignition sources of sufficient energy to cause a dust explosion. When evaluating the explosion hazard of a specific process or sample of material, the important factors to consider include: particle size and shape, dust concentration, the nature of any impurities, oxygen concentration, humidity, and extent of containment. (39)

IGNITION SENSITIVITY: Not available

EXPLOSION SEVERITY: Not available

The EXPLOSIBILITY INDEX; Not available

MINIMUM IGNITION TEMPERATURE: 790 deg C (1454 deg F) (cloud) (37,38); 290 deg C (554 deg F) (layer) (38); 710 deg C (1310 deg F) (cloud); 270 deg C (518 deg F) (layer) (lead, atomized) (39)

MINIMUM CLOUD IGNITION ENERGY: Did not ignite (38)

MAXIMUM EXPLOSION PRESSURE: 20.68 kPa (3 psi or 0.2 bar) (37,38)

MAXIMUM RATE OF PRESSURE RISE: 689 kPa/sec (greater than 100 psi/sec or 7 bar/sec) (37,38)

EXTINGUISHING MEDIA :

Lead metal is not combustible and does not support combustion. Use extinguishing media appropriate to surrounding fire conditions. (40) Finely divided lead may ignite and burn. (41) Smother fire with dry sand, clay, ground limestone, or sodium chloride based extinguishers, use approved Class D dry powder extinguishers or blanket the fire with an inert gas such as argon, helium or neon. (42,43)

FIRE FIGHTING INSTRUCTIONS :

Evacuate area and fight fire from a safe distance or a protected explosion-resistant location or maximum possible distance.

Move containers from the fire area if it can be done without risk. Confine and smother fire, if possible. Small metal fires can be controlled by the recommended extinguishing agents, but large fires may be impossible to extinguish. In this case isolate the fire, protect surroundings and allow the fire to burn itself out.

Lead and its decomposition products are hazardous to health. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not

provide adequate protection. A full-body encapsulating chemical resistant suit with positive pressure self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) may be necessary.

*** SECTION 6. ACCIDENTAL RELEASE MEASURES ***

PRECAUTIONS :

Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. Wear adequate personal protective equipment.

Notify government occupational health and safety and environmental authorities.

CLEAN-UP :

Prevent material from entering sewers or waterways.

Small spills: Shovel into clean, dry, labelled containers and cover.

Flush area with water.

Large spills: Contact fire and emergency services and supplier for advice.

*** SECTION 7. HANDLING AND STORAGE ***

HANDLING :

This material is a VERY TOXIC (POSSIBLE CANCER HAZARD, REPRODUCTIVE HAZARD, TERATOGEN, MUTAGEN) solid. There is a DANGER OF CUMULATIVE EFFECTS if inhaled or ingested. Before handling, it is extremely important that engineering controls are operating and that protective equipment requirements and personal hygiene measures are being followed. Only authorized personnel should have access to this material. They should be properly trained regarding its hazards and its safe use. Maintenance and emergency personnel should be advised of potential hazards.

If lead powder is released, immediately put on a suitable respirator and leave the area until the severity of the release is determined. In case of leaks or spills, escape-type respiratory protective equipment should be available in the work area. Unprotected persons should avoid all contact with this chemical including contaminated equipment.

Immediately report leaks, spills or ventilation failures.

Be aware of typical signs and symptoms of poisoning and first aid procedures. Any signs of illness should be reported immediately to supervisory personnel.

Use in clearly posted, designated area(s). Control access to designated area. Access doors must remain closed while this material is present.

When handling lead powder on a large scale, closed handling systems for processes should be used. If this is not possible, use in the smallest possible amounts in appropriate labelled, containment devices (e.g. fume hood). Containment devices should be made of smooth, unbreakable, compatible material. Maintain containment devices at appropriate air flow and negative pressure. Check regularly.

Avoid generating dusts. Prevent the release of dust into workplace air.

Use the proper tools to open containers. Ripping open a container can cause an uneven tear, thus making spills more likely. Cover work surfaces with compatible, chemical resistant and/or disposable material for easier containment and clean-up of spills. Good housekeeping is very important. Keeping work areas clean is essential. Use work surfaces that can be easily decontaminated.

Avoid generating vapours or mists. Prevent the release of vapours/mist into workplace air. To avoid splashing, carefully dispense into sturdy containers made of compatible materials.

Do not use with incompatible materials such as strong oxidizing agents, strong acids and strong bases. See Incompatibilities - Materials to Avoid section for more information. Never return contaminated material to its original container.

Prevent damage to containers. Label containers. Open containers carefully on a stable surface. Keep containers closed when not in use. Assume that empty containers contain residues which are hazardous.

Maintain good personal hygiene. When handling on a large scale, a double locker-shower set-up is usually necessary.

Follow handling precautions on Material Safety Data Sheet. Have suitable emergency equipment for fires, spills and leaks readily available.

Maintain handling equipment. Comply with applicable regulations.

STORAGE :

Store in a cool, dry, ventilated area, out of direct sunlight and away from

heat sources. Keep quantity stored as small as possible. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Storage facilities should be made of fire-resistant materials. Keep storage area separate from work areas, eating areas and protective equipment storage. Post warning signs. Inspect periodically for damage or leaks. Inspect all incoming containers to make sure they are properly labelled and not damaged. Store in suitable, unbreakable, labelled containers (usually the shipping container). Store away from incompatible materials, such as strong oxidizing agents, strong acids and strong bases. See Incompatibilities - Materials to Avoid section for more information. Store containers at a convenient height for handling, below eye level if possible. Keep containers tightly closed when not in use and when empty. Protect from damage. Keep empty containers in separate storage area. Empty containers may contain hazardous residues. Keep closed. Have appropriate fire extinguishers and spill clean-up equipment in storage area. Follow any special instructions for storage on Material Safety Data Sheet (e.g. maximum storage quantities).

*** SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION ***

NOTE : Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

SAMPLING AND ANALYSIS :

Use appropriate instrumentation and sampling strategy (location, timing, duration, frequency, and number of samples). Interpretation of the sampling results is related to these variables and the analytical method. Sampling should be carried out by trained personnel.

NIOSH METHOD 7082 - NIOSH manual of analytical methods. 4th edition. Volume 2. Fully evaluated method. Collection on mixed cellulose ester membrane filter. Analysis by atomic absorption spectrophotometry (AAS) (flame). Estimated detection limit: 2.6 micrograms (ug).

NIOSH METHOD 7105 - NIOSH manual of analytical methods. 4th edition. Volume 2. Partially evaluated method. Collection on mixed cellulose ester membrane filter. Analysis by atomic absorption spectrophotometry (AAS) (graphite furnace). Estimated detection limit: 0.02 ug.

NIOSH METHOD 7300 - NIOSH manual of analytical methods. 4th edition. Volume 2. Partially evaluated method for Elements by ICP. Collection on mixed cellulose ester membrane filter. Analysis by inductively coupled argon plasma (ICP-AES).

ENGINEERING CONTROLS :

Engineering methods to control hazardous conditions are preferred. Methods include mechanical (local exhaust) ventilation, process or personnel enclosure and control of process conditions. Because of the high potential hazard associated with this substance, stringent control measures such as enclosure or isolation may be necessary. Administrative controls and personal protective equipment may also be required. Use a ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Locate dust collectors outside or where permitted by regulation. Supply sufficient replacement air to make up for air removed by exhaust systems.

PERSONAL PROTECTIVE EQUIPMENT :

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protection equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance

and inspection. Refer to the CSA Standard Z94.4-93, "Selection, Care, and Use of Respirators", available from the Canadian Standards Association, Rexdale, Ontario, M9W 1R3.

RESPIRATORY PROTECTION GUIDELINES :

NIOSH RECOMMENDATIONS FOR **LEAD** CONCENTRATIONS IN AIR (45):

UP TO 0.5 mg/m³: Respirator with high-efficiency particulate filter(s); or SAR.

UP TO 1.25 mg/m³: SAR operated in a continuous-flow mode; or powered air-purifying respirator with high-efficiency particulate filter.

UP TO 2.5 mg/m³: Full-facepiece respirator with high-efficiency particulate filter(s); or SAR with a tight-fitting facepiece operated in a continuous-flow mode; or powered air-purifying respirator with tight-fitting facepiece and high-efficiency particulate filter; or full-facepiece SCBA; or full-facepiece SAR.

UP TO 50 mg/m³: Positive pressure SAR.

UP TO 100 mg/m³: Positive pressure, full-facepiece SAR.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

ESCAPE: Full-facepiece respirator with high-efficiency particulate filter(s); or escape-type SCBA.

NOTE: The IDLH concentration for **lead** is 100 mg/m³ (as Pb).

The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory protection equipment. In the event of failure of respiratory protective equipment every effort should be made to exit immediately.

The respirator use limitations specified by the approving agency and the manufacturer must be observed.

Recommendations apply only to NIOSH approved respirators.

ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus; IDLH = immediately dangerous to life or health.

EYE/FACE PROTECTION :

Chemical safety goggles. A face shield may also be necessary.

SKIN PROTECTION :

Chemical protective gloves, coveralls, boots, and/or other protective clothing to prevent skin contact.

RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING :

Most materials commonly used in protective clothing are probably adequate. No specific guidelines are available. Contact chemical manufacturer/supplier for advice.

EXPOSURE CONTROLS/PERSONAL PROTECTION COMMENTS :

Remove contaminated clothing promptly. Keep contaminated clothing in closed containers. Discard or launder before rewearing. Inform laundry personnel of contaminant's hazards.

When handling on a large scale, do not wear work clothing home. A double locker-shower setup is usually required.

Wash hands thoroughly before eating, smoking or using the washroom. Do not eat, drink, or smoke in work areas.

** EXPOSURE GUIDELINES **

* THRESHOLD LIMIT VALUES (TLVs) / AMERICAN CONFERENCE OF
GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) / 2000 *

TIME-WEIGHTED AVERAGE (TLV-TWA) : 0.05 mg/m³, Carcinogenicity Designation A3

TLV BASIS - CRITICAL EFFECT(S) : CNS (central nervous system)

GI (gastrointestinal)

Blood

Kidney

Reproductive

TLV COMMENTS :

CARCINOGENICITY DESIGNATION A3 - Animal Carcinogen: Substance is carcinogenic in laboratory animals under conditions that are not considered relevant to worker exposure. Available human studies and evidence suggest that the substance is not likely to cause cancer in humans except under unusual or unlikely routes or levels of exposure. Worker exposure to an A3 carcinogen should be controlled to levels as low as reasonably achievable below the TLV.

BIOLOGICAL EXPOSURE INDICES (BEIs): The ACGIH has adopted a BEI for this chemical. BEIs provide an indication of worker exposure by measuring the chemical or its breakdown products in the body or by measuring biochemical changes resulting from exposure to the chemical. Consult the BEI documentation for further information.

NOTE: In many jurisdictions, exposure limits are similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted, and implemented can vary, obtain detailed information from the appropriate government agency in each jurisdiction. Many jurisdictions have specific regulations requiring worksite programs for lead. Obtain detailed information from the appropriate government agency in each jurisdiction.

* PERMISSIBLE EXPOSURE LIMITS (PELs) / FINAL RULE LIMITS /
U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) *

TIME WEIGHTED AVERAGE (PEL-TWA) : 0.05 mg/m3

FINAL RULE LIMIT PEL COMMENTS :

See OSHA legislation 1910.1025

NOTE: The OSHA PEL Final Rule Limits are currently non-enforceable due to a court decision. The OSHA PEL Transitional Limits are now in force.

* PERMISSIBLE EXPOSURE LIMITS (PELs) / TRANSITIONAL LIMITS /
U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) *

TIME WEIGHTED AVERAGE (PEL-TWA) : 0.05 mg/m3

TRANSITIONAL LIMIT PEL COMMENTS :

See OSHA legislation 1910.1025

*** SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES ***

MOLECULAR WEIGHT : 207.19

CONVERSION FACTOR :

1 ppm = 8.46 mg/m3; 1 mg/m3 = 0.118 ppm at 25 deg C (calculated)

MELTING POINT : 327.4 deg C (621.3 deg F) (33,35,36)

BOILING POINT : 1740 deg C (3164 deg F) (1,33,36)

RELATIVE DENSITY (SPECIFIC GRAVITY) :

11.34 at 20 deg C (water=1) (33,35,36)

SOLUBILITY IN WATER :

Insoluble (1,14)

SOLUBILITY IN OTHER LIQUIDS :

Nitric acid and hot concentrated sulfuric acid; insoluble in organic solvents.(1)

VAPOUR DENSITY : 7.14 (air=1)

VAPOUR PRESSURE : Approximately zero at normal room temperature; 0.133 kPa (1 mm Hg) at 980 deg C (35,36)

SATURATION VAPOUR CONCENTRATION : Approximately zero at normal temperatures (calculated)

EVAPORATION RATE : Not applicable

pH VALUE : Not applicable

CRITICAL TEMPERATURE : Not applicable

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT) :

Not applicable

OTHER PHYSICAL PROPERTIES :

VISCOSITY-DYNAMIC: 2.75 mPa.s (2.75 centipoise) at 327.4 deg C; 1.70 mPa.s (1.70 centipoise) at 550 deg C (molten lead) (35,36)

SURFACE TENSION: 444 mN/m (444 dynes/cm) at 327.4 deg C (molten lead) (36)
ELECTRICAL CONDUCTIVITY: 7.8 (Cu = 100); 4.84 MS/m or 4.84×10^{18} pS/m
at 20 deg C (35)
ELECTRICAL RESISTIVITY: 20.65 microohms.cm at 20 deg C; 27.02 microohms.cm
at 100 deg C; 96.73 microohms.cm at 330 deg C (33,35,36)

*** SECTION 10. STABILITY AND REACTIVITY ***

STABILITY :

Normally stable. Fresh cut or cast lead surfaces oxidize rapidly to form an insoluble protective layer of basic lead carbonate. (36)

HAZARDOUS POLYMERIZATION :

Does not occur.

CONDITIONS TO AVOID :

LEAD POWDER: Generation of dust, sparks, flames or other sources of ignition.

HAZARDOUS DECOMPOSITION PRODUCTS :

None reported.

INCOMPATIBILITY - MATERIALS TO AVOID :

STRONG ACIDS (e.g. hot concentrated nitric acid, boiling concentrated hydrochloric acid or sulfuric acid) - may react vigorously or violently. (34,40)

HYDROGEN PEROXIDE - contact may cause violent decomposition. (41,44)

HYDROGEN PEROXIDE and TRIOXANE - mixtures may be detonated by heat, shock, or spontaneously after contact with metallic lead. (41)

SODIUM AZIDE - may form lead azide, an unstable, explosive compound. (44)

AMMONIUM NITRATE, SODIUM ACETYLIDE, SODIUM CARBIDE or CHLORINE TRIFLUORIDE - react violently or explosively with powdered lead. (41,44)

ZIRCONIUM - an alloy of lead and 10-70% zirconium will ignite when struck with a hammer. (44)

CORROSIVITY TO METALS :

Not corrosive.

*** SECTION 11. TOXICOLOGICAL INFORMATION ***

NOTE: Results from studies with lead acetate are considered relevant for identifying hazards associated with other inorganic lead compounds, including elemental lead, for two reasons. First, it is the lead component of lead acetate which is responsible for the toxic effects observed in these studies. Second, although different inorganic forms of lead have different water solubilities, absorption of inorganic salts following inhalation, which is the main route of occupational exposure, has been demonstrated to be similar. (1) CHEMINFO record 131 contains a review of the information available for lead acetate.

Standard animal toxicity values (for example, LD50s) are not available for elemental lead.

EFFECTS OF SHORT-TERM (ACUTE) AND LONG-TERM (CHRONIC) EXPOSURE: Studies on the short- and long-term health effects of elemental lead on animals have not been conducted because effects in humans are well-defined.

TERATOGENICITY/EMBRYOTOXICITY/FETOTOXICITY: No relevant information for elemental lead was located. In studies with lead acetate, neurobehavioural effects have occurred in offspring of rats at oral exposures which did not produce maternal toxicity.

REPRODUCTIVE TOXICITY: No relevant information for elemental lead was located. Altered testicular structure, effects on sperm, and effects on hormonal and biochemical processes have been observed in male animals exposed to lead acetate. Results of studies on female animals exposed to lead acetate are inconclusive. Effects on fertility have been observed in multi-generation studies with exposure to lead acetate, but only at doses which have also caused toxicity in the parents.

CARCINOGENICITY: The International Agency for Research on Cancer (IARC) has determined that the evidence for carcinogenicity to animals is sufficient for inorganic lead compounds. This conclusion is based on studies with lead acetate and other lead salts, as elemental lead has not been adequately studied.

In one study, oral administration of elemental **lead** powder, 10 mg/animal, twice a month for 12 months, did not cause more tumours in rats. (20,22)

MUTAGENICITY: The mutagenicity of elemental **lead** has not been investigated in animal or cell systems. In studies with **lead** acetate, positive results (chromosome aberrations) have been reported in rats, mice and monkeys exposed orally.

*** SECTION 12. ECOLOGICAL INFORMATION ***

NOTE : This section is subject to future development.

*** SECTION 13. DISPOSAL CONSIDERATIONS ***

Review federal, provincial and local government requirements prior to disposal. Store material for disposal as indicated in Storage Conditions.

*** SECTION 14. TRANSPORT INFORMATION ***

** CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG)
SHIPPING INFORMATION **

This chemical is not specifically listed in the Canadian Transportation of Dangerous Goods Regulations. However, it may be regulated as a part of a chemical family or group Not Otherwise Specified (N.O.S.) (e.g. LIQUID DYES N.O.S.). Consult the regulation.

NOTE: This information incorporates Schedule No. 21 amendments to the Transportation of Dangerous Goods Act, 1992, effective December 13, 1995.

** U.S. DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS
MATERIALS SHIPPING INFORMATION (49 CFR) **

This chemical is not specifically listed in the US hazardous materials shipping regulations (49 CFR, Table 172.101). However it may be regulated as part of a chemical family or group Not Otherwise Specified (N.O.S.) (e.g. mercury-based pesticides). Consult the regulation.

NOTE : This information was taken from the U.S. Code of Federal Regulations Title 49 - Transportation and is effective October 1, 1997.

*** SECTION 15. REGULATORY INFORMATION ***

** CANADIAN WORKPLACE HAZARDOUS MATERIALS
INFORMATION SYSTEM (WHMIS) **

PROPOSED WHMIS CLASSIFICATION :

- D2A - Poisonous and infectious material - Other effects - Very toxic
- D2B - Poisonous and infectious material - Other effects - Toxic

WHMIS HEALTH EFFECTS :

- Chronic toxicity - very toxic - other
- Carcinogenicity - very toxic - other
- Teratogenicity and embryotoxicity - very toxic - other
- Reproductive toxicity - very toxic - other
- Mutagenicity - toxic - other

WHMIS INGREDIENT DISCLOSURE LIST :

Included for disclosure at 0.1% or greater

DETAILED WHMIS CLASSIFICATION ACCORDING TO CRITERIA :

- CLASS A - COMPRESSED GAS: Does not meet criteria.
- CLASS B - FLAMMABLE & COMBUSTIBLE MATERIAL: Does not meet criteria for legislated classes. However, powdered **lead** is a combustible dust.
- CLASS C - OXIDIZING MATERIAL: Does not meet criteria.
- CLASS D - POISONOUS AND INFECTIOUS MATERIAL. DIVISION 1 - IMMEDIATE AND SERIOUS TOXIC EFFECTS: Insufficient information.
- Acute Lethality: Insufficient information; standard animal toxicity values are not available.
- CLASS D - POISONOUS AND INFECTIOUS MATERIAL. DIVISION 2 - OTHER TOXIC EFFECTS: Meets criteria for both "Very toxic" and "Toxic" material. See detailed evaluation below.

Chronic Health Effects: "Very toxic"; long-term occupational exposure to low levels of inorganic **lead** has resulted in significant health effects.
Carcinogenicity: "Very toxic"; IARC Group 2B.
Teratogenicity and Embryotoxicity: "Very toxic"; animal studies have shown neurobehavioural effects in the offspring of rats orally exposed to the closely related inorganic **lead** compound, **lead** acetate, at doses which did not produce maternal toxicity.
Reproductive Toxicity: "Very toxic"; significant effects reported in the male reproductive system following low to moderate **lead** exposures.
Mutagenicity: "Toxic"; positive results (chromosomal aberrations) in the white blood cells of employees with low to moderate exposure inorganic **lead** exposure reported in several studies; and in rats, mice and monkeys exposed orally to the closely related inorganic **lead** compound, **lead** acetate.
Respiratory Sensitization: Does not meet criteria; not reported as human respiratory sensitizer.
Skin Sensitization: Insufficient information; two case reports cannot be evaluated.
Skin Irritation: Does not meet criteria; inorganic **lead** compounds are not known to cause skin irritation.
Eye Irritation: Insufficient information; no relevant human or animal information.
CLASS E - CORROSIVE MATERIAL: Does not meet criteria; **lead** is not corrosive to metals.
CLASS F - DANGEROUSLY REACTIVE MATERIAL: Does not meet criteria.

** U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) **

OSHA HAZARD COMMUNICATION EVALUATION :

Meets criteria for hazardous material, as defined by 29 CFR 1910.1200.

** EUROPEAN UNION (EU)
CLASSIFICATION AND LABELLING INFORMATION **

EU CLASSIFICATION :

Toxic for Reproduction, Category 1; Toxic for Reproduction, Category 3;
Harmful; Danger of cumulative effects; Dangerous for the environment.
[Repr.Cat.1;Repr.Cat.3;Xn;R:33;N] (46)

EU RISK PHRASES :

May cause harm to the unborn child. Also, harmful by inhalation and if swallowed. Danger of cumulative effects. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Possible risk of impaired fertility. [R:61-20/22-33-50/53-62]

EU SAFETY PHRASES :

Avoid exposure - obtain special instruction before use. In case of accident or if you feel unwell, seek medical advice immediately (show label where possible). This material and/or its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheet. [S:53-45-60-61]
Safety phrases relate to the highest concentration division indicated, but may also be applicable to lower concentrations.

EU COMMENTS :

CONCENTRATION GREATER THAN OR EQUAL TO 5%: Toxic: May cause harm to the unborn child. Also, harmful by inhalation and if swallowed. Danger of cumulative effects. Possible risk of impaired fertility.
[T;R:61-20/22-33-62]

CONCENTRATION GREATER THAN OR EQUAL TO 1% AND LESS THAN 5%: Toxic: May cause harm to the unborn child. Also, harmful by inhalation and if swallowed. Danger of cumulative effects. [T;R:61-20/22-33]

CONCENTRATION GREATER THAN 0.5% AND LESS THAN 1%: Toxic: May cause harm to the unborn child. Danger of cumulative effects. [T;R:61-33]

The concentrations stated or, in the absence of such concentrations, the general concentrations of Directive 88/379/EEC are the percentages by weight of the metallic element calculated with reference to the total weight of the preparation.

There is no EC listing for elemental **lead**. The information provided above is for **lead** compounds and may be applicable to elemental **lead**.

SELECTED BIBLIOGRAPHY :

- (1) Agency for Toxic Substances and Disease Registry. Toxicological profile for **lead**. TP-92/12. US Department of Health and Human Services, 1993
- (2) The Report on the Designation of **Lead** in Ontario. Occupational Health and Safety Division, Ontario Ministry of Labour, July 1981
- (3) Gosselin, R.E., et al. Clinical toxicology of commercial products. 5th edition. Williams and Wilkins, 1984
- (4) Cohen, A.J., et al. Review of **lead** toxicology relevant to the safety assessment of **lead** acetate as a hair colouring. Food and Chemical Toxicology. Vol. 29, no. 7 (1991). p. 485-507
- (5) Grant, W.M., et al. Toxicology of the Eye. 4th edition. Charles C. Thomas, 1993
- (6) **Lead**. In: Documentation of the threshold limit values and biological exposure indices. 6th edition. American Conference of Governmental Industrial Hygienists, 1991
- (7) Nearing, J.N. Health effects of inorganic **lead** with an emphasis on the occupational setting: an update. Ontario Ministry of Labour, 1987
- (8) The Commission on **Lead** in the Environment. Health effects of **lead**. Edited by M.C.B. Hotz. The Royal Society of Canada, September, 1986
- (9) Hirata, M., et al. Effects of **lead** exposure on neurophysiological parameters. Environmental Research. Vol. 63, no. 1 (October, 1993). p. 60-69
- (10) Maizlish, N.A., et al. Neurobehavioural evaluation of Venezuelan workers exposed to inorganic **lead**. Occupational and Environmental Medicine. Vol. 52, no. 6 (June, 1995). p. 408-414
- (11) Balbus-Kornfeld, J.M., et al. Cumulative exposure to inorganic **lead** and neurobehavioural test performance in adults: an epidemiological review. Occupational and Environmental Medicine. Vol. 52, no. 1 (January, 1995). p. 2-12
- (12) Otto, D.A., et al. Auditory and visual dysfunction following **lead** exposure. NeuroToxicology. Vol. 14, no. 2-3 (Summer/Fall, 1993). p. 191-208
- (13) Matsumoto, T., et al. Relations between **lead** exposure and peripheral neuromuscular functions of **lead**-exposed workers: results of tapping test. Environmental Research. Vol. 61, no. 2 (May, 1993). p. 299-307
- (14) International Programme on Chemical Safety (IPCS). Inorganic **lead**. Environmental Health Criteria; 165. World Health Organization, 1995
- (15) Toxic effects of metals: **lead**. In: Casarett and Doull's Toxicology: the basic science of poisons. 5th edition. Edited by M.O. Amdur, et al. McGraw-Hill, 1995. p. 703-709
- (16) Gennart, J.P., et al. Assessment of thyroid, testes, kidney and autonomic nervous system function in **lead**-exposed workers. International Archives of Occupational and Environmental Health. Vol. 64, no.1 (1992). p. 49-57
- (17) Goyer, R.A. **Lead** toxicity: current concerns. Environmental Health Perspectives. Vol. 100 (April, 1993). p. 177-187
- (18) Fischbein, A., et al. The immune system as target for subclinical **lead** related toxicity. British Journal of Industrial Medicine. Vol. 50, no. 2 (February, 1993). p. 185-186
- (19) Cronin, E. Contact dermatitis. Churchill Livingstone, 1980. p. 337-338
- (20) International Agency for Research on Cancer. **Lead** and **lead** compounds: **lead** and inorganic **lead** compounds (Group 2B). In: IARC monographs on the evaluation of carcinogenic risks to humans. Supplement 7. Overall Evaluations of Carcinogenicity: an updating of IARC monographs volumes 1 to 42. World Health Organization, 1987. p. 65, 230-232
- (21) Fu, H., et al. Cancer and occupational exposure to inorganic **lead** compounds: a meta-analysis of published data. Occupational and Environmental Medicine. Vol. 52, no. 2 (February, 1995). p. 73-81
- (22) International Agency for Research on Cancer. **Lead** and **lead** compounds. In: IARC monographs on the evaluation of carcinogenic risks to humans. Volume 23. Some metals and metallic compounds. World Health Organization, July, 1980. p. 325-415
- (23) Ernhart, C.B. A critical review of low-level prenatal **lead** exposure in humans. 1. Effects on the fetus and newborn. Reproductive Toxicology. Vol. 6, no. 1 (1992). p. 9-19
- (24) Ernhart, C.B. A critical review of low-level prenatal **lead** exposure in humans. 2. Effects on the developing child. Reproductive Toxicology.

- (25) Bellingher, D. Teratogen update: **lead**. Teratology. Vol. 50, no. 5 (November, 1994). p. 367-373
- (26) Hatch, M.C. Prenatal and postnatal exposure to **lead** in relation to infant development: a review. Division of Standards Development and Transfer Technology, National Institute for Occupational Safety and Health, January, 1992. (NIOSH Purchase Order No. 0009139428)
- (27) Andrews, K.W., et al. Prenatal **lead** exposure in relation to gestational age and birth weight: a review of epidemiologic studies. American Journal of Industrial Medicine. Vol. 26, no. 1 (July, 1994). p. 13-32
- (28) Winder, C. **Lead**, reproduction and development. NeuroToxicology. Vol. 14, no. 2-3 (Summer/Fall, 1993). p. 303-318
- (29) Tas, S., et al. Occupational hazards for the male reproductive system. Current Reviews in Toxicology. Vol. 26, issue 3 (1996). p. 261-307
- (30) Lancranjan, I., et al. Reproductive ability of workmen occupationally exposed to **lead**. Archives of Environmental Health. Vol. 30, no. 8 (August, 1975). p. 396-401
- (31) Savitz, D.A., et al. Review of epidemiologic studies of paternal occupational exposure and spontaneous abortion. American Journal of Industrial Medicine. Vol. 25, no. 3 (March, 1994). p. 361-383
- (32) Kristensen, P., et al. Perinatal outcome among children of men exposed to **lead** and organic solvents in the printing industry. American Journal of Epidemiology. Vol. 137, no. 2 (January 15, 1993). p. 134-144
- (33) Budavari, S, ed. The Merck index: an encyclopedia of chemicals, drugs, and biologicals. 12th edition. Merck and Co., Inc., 1996
- (34) HSDB database record for **lead**. Last revision date: 97/08/13
- (35) King, M., et al. **Lead**. In: Kirk-Othmer encyclopedia of chemical technology. 4th edition. Volume 15. John Wiley and Sons, 1995. p. 69-113
- (36) Sutherland, C.A., et al. **Lead**. In: Ullmann's encyclopedia of industrial chemistry. 5th completely revised edition. Vol. A 15. VCH Verlagsgesellschaft, 1990. p. 193-236
- (37) Field, P. Dust explosions. Elsevier Scientific Publishing Company, 1982. p. 212
- (38) Grossel, S.S. Safety considerations in conveying of bulk solids and powders. Journal of Loss Prevention in the Process Industries. Vol. 1 (April, 1988). p. 62-74
- (39) Schwab, R.F. Dusts. In: Fire protection handbook. Edited by G.P. McKinnon. 15th edition. National Fire Protection Association, 1981. p. 4-84 to 4-97
- (40) The Sigma-Aldrich library of chemical safety data. Edition II. Volume 1. Sigma-Aldrich Corporation, 1988
- (41) Urben, P.G., ed. Bretherick's handbook of reactive chemical hazards. 5th edition. Volume 1. Butterworth-Heinemann Ltd., 1995
- (42) Slye, Jr., O.M. Fire extinguishing agents. In: Ullmann's encyclopedia of industrial chemistry. 5th completely revised edition. Vol. A 11. VCH Verlagsgesellschaft, 1988. p. 119, 121
- (43) Tapscott, R.E. Metals; and Combustible metal extinguishing agents and application techniques. In: Fire protection handbook. Edited by A.E. Cote, et al. 18th edition. National Fire Protection Association, 1997. p. 4-182 to 4-189 (Metals); 6-401 to 6-405 (Combustible metal extinguishing agents and application techniques)
- (44) Fire protection guide to hazardous materials. 11th edition. National Fire Protection Association, 1994
- (45) NIOSH pocket guide to chemical hazards. National Institute for Occupational Safety and Health, June 1997
- (46) European Communities. Commission Directive 98/98/EC. December 15, 1998

Information on chemicals reviewed in the CHEMINFO database is drawn from a number of publicly available sources. A list of general references used to compile CHEMINFO records is available in the database Help.

REVIEW/PREPARATION DATE :
1998-05-27
REVISION INDICATORS :
TLV comments; 1998-08

*** SECTION 1. CHEMICAL IDENTIFICATION ***

CHEMINFO RECORD NUMBER : 3356
CCOHS CHEMICAL NAME : Chlorodiphenyl (42% chlorine)
SYNONYMS :
* Aroclor - 1242
* PCB - 1242
* PCB 1242
* Polychlorinated biphenyl 1242
CAS REGISTRY NUMBER : 53469-21-9
UN/NA NUMBER(S) : 2315
RTECS NUMBER(S) : TQ1356000
EU EINECS/ELINCS NUMBER : 215-648-1
CHEMICAL FAMILY : Halogenated aromatic hydrocarbon /
halogenated biphenyl / halobiphenyl /
chlorobiphenyl / monochlorobiphenyl
MOLECULAR FORMULA : Cl2-H7-Cl3 (approximately)

STATUS :

This CHEMINFO record for this chemical is not complete. It only contains readily available information at this time.

*** SECTION 2. DESCRIPTION ***

APPEARANCE AND ODOUR :

Colourless to light-coloured viscous liquid with a mild hydrocarbon odour (1)

ODOUR THRESHOLD :

Not available

*** SECTION 3. HAZARDS IDENTIFICATION ***

** POTENTIAL HEALTH EFFECTS **

CARCINOGENICITY :

Overall IARC evaluation of carcinogenic risk: Group 2A (probably carcinogenic to humans). NTP has listed other polychlorinated biphenyls as substances which may reasonably be anticipated to be carcinogens.(5) Consult NTP report for further information.

*** SECTION 5. FIRE FIGHTING MEASURES ***

FLASH POINT :

176-180 deg C (349-356 deg F) (open cup) (2)

LOWER FLAMMABLE (EXPLOSIVE) LIMIT (LFL/LEL) :

Not available

UPPER FLAMMABLE (EXPLOSIVE) LIMIT (UFL/UEL) :

Not available

AUTOIGNITION (IGNITION) TEMPERATURE :

Not available

COMBUSTION AND THERMAL DECOMPOSITION PRODUCTS :

Exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.

FIRE HAZARD SUMMARY :

During a fire, toxic PCBs, polychlorinated dibenzofurans and chlorinated dibenzo-p-dioxins may be generated.

EXTINGUISHING MEDIA :

Dry chemical, carbon dioxide, water spray or foam (2)

*** SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION ***

NOTE : Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

SAMPLING AND ANALYSIS :

NIOSH METHOD 5503 - NIOSH Manual of Analytical Methods. 4th ed. Vol. 3. Partially evaluated method. Collection on glass fibre membrane filter, and Florisil sorbent tube. Desorption with hexane. Analysis by gas chromatography using electron capture detector (ECD). Estimated detection limited: 0.03 ug.

Use appropriate instrumentation and sampling strategy (location, timing, duration, frequency, and number of samples). Interpretation of the sampling results is related to these variables and the analytical method. Sampling should be carried out by trained personnel.

PERSONAL PROTECTIVE EQUIPMENT :

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protection equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4-93, "Selection, Care, and Use of Respirators", available from the Canadian Standards Association, Rexdale, Ontario, M9W 1R3.

RESPIRATORY PROTECTION GUIDELINES :

NIOSH RECOMMENDATIONS FOR CHLORODIPHENYL (42% CHLORINE) CONCENTRATIONS IN AIR (1):

AT CONCENTRATIONS ABOVE THE NIOSH REL, OR WHERE THERE IS NO REL, AT ANY DETECTABLE CONCENTRATION: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.

ESCAPE: Gas mask with organic vapour canister and high-efficiency particulate filter; or escape-type SCBA.

NOTE: The NIOSH Recommended Exposure Limit (REL) for chlorodiphenyl (42% chlorine) is 0.001 mg/m3 (time-weighted average concentration).

NOTE: NIOSH has classified this material as a potential occupational carcinogen, according to specific NIOSH criteria. This classification is reflected in these recommendations for respiratory protection, which specify that only the most reliable and protective respirators be worn. The requirements in Canadian jurisdictions may vary.

The respirator use limitations specified by the approving agency and the manufacturer must be observed.

Recommendations apply only to NIOSH approved respirators.

ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus; IDLH = immediately dangerous to life or health.

RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING :

Guidelines for polychlorinated biphenyls (PCB) (4):

RECOMMENDED (resistance to breakthrough longer than 8 hours): butyl rubber, neoprene, Teflon(TM), Viton(TM), Saranex(TM), Barricade(TM), Responder(TM).

RECOMMENDED (resistance to breakthrough longer than 4 hours): 4H(TM) (polyethylene/ethylene vinyl alcohol).

CAUTION, use for short periods only (resistance to breakthrough within 1 to 4 hours): nitrile rubber.

NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): natural rubber, polyethylene.

This material is a recognized skin absorption hazard (ACGIH or OSHA).

Recommendations are NOT valid for very thin natural rubber, neoprene, nitrile and pvc gloves (0.3 mm or less).

Recommendations are valid for permeation rates reaching 0.1 ug/cm²/min or 1 mg/m²/min and over. Resistance of specific materials can vary from product to product. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.

** EXPOSURE GUIDELINES **

* THRESHOLD LIMIT VALUES (TLVs) / AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) / 2002 *

TIME-WEIGHTED AVERAGE (TLV-TWA) : 1 mg/m³, skin

TLV BASIS - CRITICAL EFFECT(S) : Irritation

Chloracne (acne caused by chlorine compound)
Liver

TLV COMMENTS :

"SKIN" NOTATION: Contact with skin, eyes, and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

NOTE: In many jurisdictions, exposure limits are similar to the ACGIH TLVs. Since the manner in which exposure limits are established, interpreted, and implemented can vary, obtain detailed information from the appropriate government agency in each jurisdiction.

* PERMISSIBLE EXPOSURE LIMITS (PELs) / FINAL RULE LIMITS / US OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) *

TIME-WEIGHTED AVERAGE (PEL-TWA) : 1 mg/m³, skin

FINAL RULE LIMIT PEL COMMENTS :

"SKIN" DESIGNATION: Skin contact can contribute to the overall exposure to this chemical. Prevent or reduce skin absorption through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

NOTE: The OSHA PEL Final Rule Limits are currently non-enforceable due to a court decision. The OSHA PEL Transitional Limits are now in force.

* PERMISSIBLE EXPOSURE LIMITS (PELs) / TRANSITIONAL LIMITS / US OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) *

TIME-WEIGHTED AVERAGE (PEL-TWA) : 1 mg/m³, skin

TRANSITIONAL LIMIT PEL COMMENTS :

"SKIN" DESIGNATION: Skin contact can contribute to the overall exposure to this chemical. Prevent or reduce skin absorption through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

*** SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES ***

MOLECULAR WEIGHT : 258 (approximately)

CONVERSION FACTOR :

1 ppm = 10.53 mg/m³; 1 mg/m³ = 0.095 ppm at 25 deg C (calculated)

MELTING POINT : -19 deg C (-2 deg F) (1)

BOILING POINT : 325-366 deg C (617-691 deg F) (1,2)

RELATIVE DENSITY (SPECIFIC GRAVITY) :

1.31 at 25 deg C (water=1) (1)

SOLUBILITY IN WATER :

Slightly soluble; 0.10 mg/100 mL at 24 deg C (3)

SOLUBILITY IN OTHER LIQUIDS :

Not available

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT) :

Log P(oct) = 4.11 (2)

pH VALUE

: Not available

VAPOUR DENSITY

: 8.9 (air=1)

VAPOUR PRESSURE

: 1.33x10⁻⁴ kPa (0.001 mmHg) at 20 deg C (1)

SATURATION VAPOUR CONCENTRATION

: 1.3 ppm (0.0001%) at 20 deg C (calculated)

EVAPORATION RATE

: Not available

CRITICAL TEMPERATURE

: Not available

*** SECTION 10. STABILITY AND REACTIVITY ***

STABILITY :

Normally stable

HAZARDOUS POLYMERIZATION :

Does not occur

CONDITIONS TO AVOID :

Temperatures above 176-180 deg C

*** SECTION 12. ECOLOGICAL INFORMATION ***

NOTE : Inclusion of Ecological Information on an MSDS is optional under the US Hazard Communication Standard and the Canadian Controlled Products Regulations (WHMIS). In other jurisdictions, inclusion of Ecological Information may be a requirement. For specific requirements, contact the relevant regulatory authorities in the jurisdiction where the MSDS is intended to be used.

The American National Standard for Hazardous Industrial Chemicals - Material Safety Data Sheets - Preparation (ANSI 2400.1-1998) provides advice on data that could be included in this section, as well as ecotoxicological tests and issues.

Databases in CCOHS's CD-ROM and Web collection which contain useful Ecological Information include CESARS, HSDB(R) (Hazardous Substances Data Bank) and CHRIS (Chemical Hazards Response Information System).

*** SECTION 14. TRANSPORT INFORMATION ***

** CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG)
SHIPPING INFORMATION **

SHIPPING NAME AND DESCRIPTION: ARTICLES CONTAINING POLYCHLORINATED BIPHENYLS (PCB) regulated only when the concentration is more than 50 ppm by mass; or
POLYCHLORINATED BIPHENYLS (PCB) regulated only when the concentration is more than 50 ppm by mass
UN NUMBER: UN2315
CLASS: 9
PACKING GROUP/RISK GROUP: II
SPECIAL PROVISIONS: ---
PASSENGER CARRYING ROAD/RAIL LIMIT: 100 kg or L
MARINE POLLUTANT: Severe Pollutant

NOTE: This information incorporates the Transportation of Dangerous Goods Regulations SOR/2001-286, effective August 1, 2002.

** US DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS
MATERIALS SHIPPING INFORMATION (49 CFR) **

HAZARDOUS MATERIAL DESCRIPTION AND PROPER SHIPPING NAME:
Polychlorinated biphenyls

HAZARD CLASS OR DIVISION: 9
IDENTIFICATION NUMBER: UN2315
PACKING GROUP: II

NOTE : This information was taken from the US Code of Federal Regulations Title 49 - Transportation and is effective October 1, 1997.

*** SECTION 15. REGULATORY INFORMATION ***

** CANADIAN WORKPLACE HAZARDOUS MATERIALS
INFORMATION SYSTEM (WHMIS) **

WHMIS INGREDIENT DISCLOSURE LIST :

Included for disclosure at 0.1% or greater

** EUROPEAN UNION (EU)
CLASSIFICATION AND LABELLING INFORMATION **

EU CLASSIFICATION :

Danger of cumulative effects; Dangerous for the Environment. [R:33;N]

EU RISK PHRASES :

Danger of cumulative effects. Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment. [R:33-50/53]

EU SAFETY PHRASES :

Keep out of reach of children.* This material and its container must be disposed of in a safe way.

This material and/or its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheet. [S:(2-)*35-60-61]

*This safety phrase can be omitted from the label when the substance or preparation is sold for industrial use only.

The product label must indicate if the substance is a specific isomer or a mixture of isomers.

EU COMMENTS :

CONCENTRATION GREATER THAN OR EQUAL TO 0.005%: Harmful. Danger of cumulative effects. [Xn;R:33]

*** SECTION 16. OTHER INFORMATION ***

SELECTED BIBLIOGRAPHY :

- (1) NIOSH pocket guide to chemical hazards. NIOSH, June 1994. p. 64
- (2) HSDB record for Aroclor 1242. Last updated 9501
- (3) Verschuere, K. Handbook of environmental data on organic chemicals. 2nd ed. Van Nostrand Reinhold, 1983. p. 216
- (4) Forsberg, K., et al. Quick selection guide to chemical protective clothing. 3rd ed. Van Nostrand Reinhold, 1997
- (5) Eighth Report on Carcinogens, 1998 Summary. U.S. Department of Health and Human Services, National Toxicology Program, 1998

Information on chemicals reviewed in the CHEMINFO database is drawn from a number of publicly available sources. A list of general references used to compile CHEMINFO records is available in the database Help.

REVIEW/PREPARATION DATE :

1995-12-27

REVISION INDICATORS :

US transport; 1998-03-01
Resistance of materials; 1998-06-01
TLV comments; 1998-08-01
Bibliography; 1999-02-01
Carcinogenicity; 1999-02-01

Attachment 3 – Safety and Health Forms

**Cornell-Dubilier Electronics Superfund Site
Operable Unit 02
South Plainfield, New Jersey**

Safety and Health Plan Revision Approval

**The attached changes/additions to the Safety and Health Plan are
approved by:**

*Contracting Officer Representative
USACE*

Date

*Alfred LaGreca, Corporate Project Manager
Sevenson Environmental Services, Inc.*

Date

*Paul Hitcho Ph.D., CIH, Safety and Health Manager
Sevenson Environmental Services, Inc.*

Date

*Kim Lickfield, Project Manager
Sevenson Environmental Services, Inc.*

Date

*Sam Tavelaris, Site Safety and Health Officer
Sevenson Environmental Services, Inc.*

Date

Operational Equipment Checklist

Date:

Equipment Checked:

Check Performed By:

Safety Equipment Pass Fail N/A Comments

Lights				
Backup Alarm				
Seat Belt				
Horn				
Windshield				
Fire Extinguisher				
Other				

Physical Inspection

Comments

Evidence of Contamination	Yes	No	
Certificate of Decontamination	Yes	No	
Damage to frame, body and/or operable parts	Yes	No	
Hoses	Good	Bad	
Fluid Levels	Good	Bad	
Tires/tracks	Good	Bad	
Other			

Name of Inspecting Person

Signature of Inspecting Person

Date

DAILY EXCAVATION CHECKLIST

Location of Excavation: _____

Name of Qualified Person: _____

Date of Inspection: _____ Utility Locate No.: _____

Soil Type: ☐ Stiff Clay ☐ Firm Clay ☐ Dry Granular
☐ Wet Granular ☐ Saturated Granular ☐ Running

Hydrostatic Conditions: ☐ Dry ☐ Wet ☐ Saturated

Weather Conditions: ☐ Sunny ☐ Overcast ☐ Rain

Angle of Repose: (width and height) _____

Unsupported Wall Height: (measurement required) _____

Protection Required: ☐ Trench Box ☐ Shoring ☐ Sheeting
☐ Benching ☐ Sloping

Personal Protection Requirements: (list) _____

Egress/Ingress: (identify) _____

Ladders/Ramps Location: _____

Location of Spoils: _____

Location of Overhead Lines: _____

Name of Spotter for Overhead Lines: _____

Sketch excavation plan on reverse side and retain in file for 3 years.

EXCAVATION SITE PLAN

LOCATION

A large grid area for drawing the excavation site plan. The grid is composed of small squares, providing a scale for the site plan. The grid is empty, ready for the user to draw the site plan.

ABOVE GROUND CONSIDERATIONS

- | | |
|---|---|
| <input type="checkbox"/> Building Overhangs | <input type="checkbox"/> Tree Overhangs |
| <input type="checkbox"/> Electrical Lines | <input type="checkbox"/> Traffic Lights |
| <input type="checkbox"/> Canopies | <input type="checkbox"/> Street Lights |

GROUND LEVEL CONSIDERATIONS

- | | |
|---|--------------------------------------|
| <input type="checkbox"/> Buildings | <input type="checkbox"/> Towers |
| <input type="checkbox"/> Manholes | <input type="checkbox"/> Shrubs |
| <input type="checkbox"/> Trees | <input type="checkbox"/> Fences |
| <input type="checkbox"/> Hydrant | <input type="checkbox"/> Signs |
| <input type="checkbox"/> PIVs | <input type="checkbox"/> Lamp Posts |
| <input type="checkbox"/> Parking Lots | <input type="checkbox"/> Guard Posts |
| <input type="checkbox"/> D-Islands | <input type="checkbox"/> Gate Arms |
| <input type="checkbox"/> Curbs | <input type="checkbox"/> TV Cameras |
| <input type="checkbox"/> Ditches/Drains | <input type="checkbox"/> Walls |

BELOW GROUND CONSIDERATIONS

- | Site Prints | Building Prints |
|--|---|
| <input type="checkbox"/> Site Lightings | <input type="checkbox"/> Fuel Lines |
| <input type="checkbox"/> Comm. Duct Bank | <input type="checkbox"/> Electricity for Gate Arms |
| <input type="checkbox"/> 13.2 kV Electricity | <input type="checkbox"/> Electricity for TV Cameras |
| <input type="checkbox"/> Fire Line | <input type="checkbox"/> UST (Tanks) |
| <input type="checkbox"/> Water | |
| <input type="checkbox"/> Natural Gas | |
| <input type="checkbox"/> Lawn Irrigation | |
| <input type="checkbox"/> Chilled Water | |
| <input type="checkbox"/> Steam | |
| <input type="checkbox"/> Sanitary | |

Sevenson Environmental Services, Inc.
DAILY SAFETY REPORT

DATE:

WORK PERIOD COVERED:

WEATHER CONDITIONS:

SUMMARY OF DAY'S WORK ACTIVITY:

EQUIPMENT UTILIZED BY SAFETY MONITORS:

PROTECTIVE CLOTHING AND EQUIPMENT BEING USED BY TASK:

PHYSICAL CONDITION OF WORKERS (any heat or cold stress or other medical problems):

ACCIDENTS OR BREACH OF PROCEDURES:

DESCRIPTION OF MONITORING AND AIR SAMPLES TAKEN:

TYPE AND NUMBER OF PERMITS ISSUED: RWP

SUMMARY OF TRAINING AND SAFETY MEETING:

NAME:

TITLE: Site Safety and Health Officer

SIGNATURE:

Sevenson Environmental Services, Inc.
Daily Safety Meeting

[illegible]

Sevenson Environmental Services, Inc.

Acknowledgment of Site Safety and Health Plan

I certify that I have read and understand the contents of the Site Safety and Health Plan

[illegible]

No. _____

Address _____



**Sevenson
Environmental
Services, Inc.**

Report of Accident, Injury, or Illness

Instructions: Please print. Fill in all blanks. When completed, return this form to Sharon Lee at the main office.

Name _____ Sex: _____ Age: _____

Social Security Number _____ Birth Date: _____

Address _____ Phone Number _____

Marital Status ☐ Single ☐ Married ☐ Separated ☐ Divorced ☐ Widowed

of Dependents _____ Date of Accident _____ Time _____ AM/PM

Date Employee notified employer: _____ Who was notified: _____

Employment Start Date:	Wage Rate:
Occupation:	Average Hours Worked:
Date Last Worked:	Average Days Per Week:
Time Shift Began:	Was worker paid for day of injury?
Name of Witness:	Did salary continue?
Describe how the accident happened:	
What was employee doing when injured?	
Describe the injury in detail and indicate part of body affected:	
Name of object or substance that directly injured the employee:	

Date & Time medical attention was sought:
Name, address and phone number of hospital or doctor:
Was employee involved in any other incidents/accidents? If yes, describe:
Any history of work accidents, absenteeism, and/or disciplinary problems:
Substance abuse test administered: <input type="checkbox"/> Yes, <input type="checkbox"/> No – if no, why not?
Medical release obtained:
Corrective Action Taken:

Supervisor _____ Date _____

Safety Officer _____ Date _____

Comments: _____

Report of Accident, Injury, or Illness

Sevenson Environmental Services, Inc.

Accident / Vandalism Report

INCIDENT DATE:

TIME OF INCIDENT:

INCIDENT REPORTED TO AUTHORITIES?

___ YES

___ NO

INCIDENT REPORTED BY:

AUTHORITIES:

DESCRIPTION (Include applicable vehicle information):

ESTIMATED DAMAGE AMOUNT: \$

SIGNATURE: _____

(For Safety Staff only)		REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT <i>(For Use of this Form See Help Menu and USACE Suppl to AR 385-40)</i>		REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)
1. ACCIDENT CLASSIFICATION						
PERSONNEL CLASSIFICATION		INJURY/ILLNESS/FATAL		PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED
GOVERNMENT <input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>
<input type="checkbox"/> CONTRACTOR		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>
<input type="checkbox"/> PUBLIC		<input type="checkbox"/> FATAL <input type="checkbox"/> OTHER		<div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div>		<div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div>
2. PERSONAL DATA						
a. Name (Last, First, MI)		b. AGE	c. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE		d. SOCIAL SECURITY NUMBER	e. GRADE
f. JOB SERIES/TITLE		g. DUTY STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ON DUTY <input type="checkbox"/> TDY <input type="checkbox"/> OFF DUTY		EMPLOYMENT STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ACTIVE <input type="checkbox"/> RESERVE <input type="checkbox"/> VOLUNTEER <input type="checkbox"/> PERMANENT <input type="checkbox"/> TEMPORARY <input type="checkbox"/> SEASONAL <input type="checkbox"/> STUDENT <input type="checkbox"/> OTHER (Specify)		
3. GENERAL INFORMATION						
a. DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time)	c. EXACT LOCATION OF ACCIDENT			d. CONTRACTOR'S NAME	
					(1) PRIME:	
e. CONTRACT NUMBER		f. TYPE OF CONTRACT		g. HAZARDOUS/TOXIC WASTE ACTIVITY		(2) SUBCONTRACTOR:
<input type="checkbox"/> CIVIL WORKS <input type="checkbox"/> MILITARY <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> SERVICE <input type="checkbox"/> A/E <input type="checkbox"/> DREDGE <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> SUPERFUND <input type="checkbox"/> DERP <input type="checkbox"/> IRP <input type="checkbox"/> OTHER (Specify)		
4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see help menu)						
a. CONSTRUCTION ACTIVITY			b. TYPE OF CONSTRUCTION EQUIPMENT			
(CODE) #			(CODE) #			
5. INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items a, f & g - see help menu)						
a. SEVERITY OF ILLNESS/INJURY			b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY	
(CODE) #						
e. BODY PART AFFECTED			g. TYPE AND SOURCE OF INJURY/ILLNESS			
PRIMARY (CODE) #			TYPE (CODE) #			
SECONDARY (CODE) #						
f. NATURE OF ILLNESS / INJURY			SOURCE (CODE) #			
(CODE) #						
6. PUBLIC FATALITY (Fill in line and correspondence code number in box - see help menu)						
a. ACTIVITY AT TIME OF ACCIDENT			b. PERSONAL FLOATATION DEVICE USED?			
(CODE) #			<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			
7. MOTOR VEHICLE ACCIDENT						
a. TYPE OF VEHICLE		b. TYPE OF COLLISION		c. SEAT BELTS	USED	NOT USED
<input type="checkbox"/> PICKUP/VAN <input type="checkbox"/> AUTOMOBILE <input type="checkbox"/> TRUCK <input type="checkbox"/> OTHER (Specify)		<input type="checkbox"/> SIDE SWIPE <input type="checkbox"/> HEAD ON <input type="checkbox"/> REAR END <input type="checkbox"/> BROADSIDE <input type="checkbox"/> ROLL OVER <input type="checkbox"/> BACKING <input type="checkbox"/> OTHER (Specify)		(1) FRONT SEAT		
				(2) REAR SEAT		
8. PROPERTY/MATERIAL INVOLVED						
a. NAME OF ITEM		b. OWNERSHIP			c. \$ AMOUNT OF DAMAGE	
(1)						
(2)						
(3)						
9. VESSEL/FLOATING PLANT ACCIDENT (Fill in line and correspondence code number in box from list - see help menu)						
a. TYPE OF VESSEL/FLOATING PLANT			b. TYPE OF COLLISION/MISHAP			
(CODE) #			(CODE) #			
10. ACCIDENT DESCRIPTION (Use additional paper, if necessary)						

See attached page.

11. CAUSAL FACTOR(S) (Read instruction Before Completing)					
a. (Explain YES answers in Item 13)		YES NO	a. (CONTINUED)		
DESIGN: Was design of facility, workplace or equipment a factor?		<input type="checkbox"/> <input type="checkbox"/>	CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?		
INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?		<input type="checkbox"/> <input type="checkbox"/>	OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?		
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?		<input type="checkbox"/> <input type="checkbox"/>	SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?		
OPERATING PROCEDURES: Were operating procedures a factor?		<input type="checkbox"/> <input type="checkbox"/>	PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?		
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?		<input type="checkbox"/> <input type="checkbox"/>	DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident?		
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?		<input type="checkbox"/> <input type="checkbox"/>	b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?		
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> YES (If yes, attach a copy.) <input type="checkbox"/> NO		

12. TRAINING		
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? <input type="checkbox"/> YES <input type="checkbox"/> NO	b. TYPE OF TRAINING. <input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB	c. DATE OF MOST RECENT FORMAL TRAINING. (Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)	
a. DIRECT CAUSE	See attached page.
b. INDIRECT CAUSE(S)	See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).	
DESCRIBE FULLY: <div style="text-align: center;">See attached page.</div>	

15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.					
a. BEGINNING (Month/Day/Year)			b. ANTICIPATED COMPLETION (Month/Day/Year)		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div, Br, Sect)		f. OFFICE SYMBOL
CORPS _____					
CONTRACTOR _____					

16. MANAGEMENT REVIEW (1st)		
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS		
SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)		
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS		
SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW		
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS		
SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL	
COMMENTS	
COMMANDER SIGNATURE	DATE

ACCIDENT DESCRIPTION (Continuation)

13a.

DIRECT CAUSE (Continuation)

13b.

INDIRECT CAUSES (Continuation)

14.

ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) (Continuation)

Sevenson Environmental Services, Inc.

Certificate of Decontamination

EQUIPMENT:

EQUIPMENT NUMBER:

DATE DECONTAMINATED:

PROCEDURE USED:

(Site Safety Officer)

Sevenson Environmental Services, Inc.

CONFINED SPACE PERMIT

Date _____ Time of Issue _____ Length of Permit _____

Location _____ Equipment ID _____

Purpose of Entry & Description of Work _____

Authorized Entrant(s) _____

Will "HOT" Work be authorized for this Entry? _____ No _____ Yes (describe) _____

HAZARDOUS IDENTIFICATION

Indicate ALL potential Hazards of this Permit Space:

YES N/A

- a. Contains or may contain a hazardous atmosphere
b. Contains a material for potential engulfment
c. Has an internal configuration for potential entrapment
If "Yes", describe _____

- d. Contains the following serious safety or health Hazards: _____

PRE-ENTRY PREPARATION

		YES	N/A	Done			Removed		
				Date	Time	By	Date	Time	By
1. Lines broken and/or blanked:									
Line Contents	Location								
a.									
b.									
c.									
2. Drain or at a workable level									
3. Purge - flush and vent									
4. Force air to bottom & vent									
5. Lock out power feeds:									
Equip/Location of Lock out									
a.									
b.									
c.									
6. Shut-off heating systems									
7. Other:									

	P.E.L.	Time		Time	Time	Time
		Tester		Tester	Tester	Tester
		Yes	N/A	Results	Results	Results
% of Oxygen	19.5% to 23%					
Temperature	110°F/43°C					
% of LEL	Any % over 10					
Hydrogen Sulfide	10 ppm					

PREVENTION OF UNAUTHORIZED ENTRY

- | | |
|--|-------|
| | YES |
| 1. Have Worker(s) to enter been trained for this specific entry? | _____ |
| 2. Have Attendants been trained for this specific space? | _____ |
| 3. Post "WORKER IN CONFINED SPACE" Sign | _____ |
| 4. Set-up the following additional barriers: | |
| _____ | |
| _____ | |

MANDATORY SAFETY EQUIPMENT REQUIRED

- | | | |
|------------------------------------|-------|-------|
| | YES | N/A |
| 1. Fire Extinguisher | _____ | _____ |
| 2. Retrieval Lines | _____ | _____ |
| 3. Respirator | _____ | _____ |
| 4. Goggles | _____ | _____ |
| 5. Hearing Protection | _____ | _____ |
| 6. Protective Clothing | _____ | _____ |
| 7. Special Boots or Shoes | _____ | _____ |
| 8. Gloves | _____ | _____ |
| 9. Other Safety Equipment Required | _____ | _____ |

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

COMMUNICATION PROCEDURES AND EQUIPMENT TO BE USED FOR THIS ENTRY

(Verify that chosen equipment is in place and operation.)

- | | |
|----------|--------------|
| | Verified by: |
| 1. _____ | _____ |
| 2. _____ | _____ |

RESCUE EQUIPMENT TO BE PROVIDED ON-SITE

YES N/A

- a. Two chest harnesses or two wristlets
Two five minute supplied air escape respirators
c. One 30 minute S.C.B.A.
d. One emergency siren
e. Man basket
f. Retrieval wench
g. Other necessary Rescue Equipment
- _____
- _____
- _____
- _____

IN CASE OF EMERGENCY

Rescue Service

Phone Number or Ext.

1. _____
2. _____
3. _____

Authorizer must sign below AFTER all the above actions are fully understood and conditions necessary for SAFE entry have been met.

Authorizer of Entry _____

Signature

Date

Time

Upon completion of the entry covered by this Permit, and after all entrants have exited the Permit space, **Authorizer** must sign below.

Canceled by _____

Signature

Date

Time

Sevenson Environmental Services, Inc.

Daily Air Monitoring Report

Project Number:	Project Name:	Project Supervisor
------------------------	----------------------	---------------------------

Date:	Duration of Monitoring
--------------	-------------------------------

Work Location and Task:

Instrument:		Instrument:		Instrument:	
Reading	Time	Reading	Time	Reading	Time

Calibration:	Calibration:	Calibration:
---------------------	---------------------	---------------------

Perimeter Samples Collected:

Personnel Samples Collected:

Perimeter and Personnel Sample Results from Previous Day (Provide Data when Received):

Comments:

Name:	Title:
--------------	---------------

Signature:	Date:
-------------------	--------------

[illegible]

Calibration:

Calibration:

Calibration:

Signature:

Date:

Sevenson Environmental Services, Inc. EMPLOYEE & VISITOR LOG

DATE: _____

[illegible]

Sevenson Environmental Services, Inc.
EMPLOYEE MEDICAL DATA SHEET

Task/Activity:

Name:

Address:

Home Telephone: Area Code ()

Age:

Height:

Weight:

In Case of Emergency contact:

Address:

Telephone: Area Code ()

Do you wear contact lenses: Yes () No ()

Allergies:

List medication(s) taken regularly:

Particular sensitivities:

Previous/current medical conditions or exposures to hazardous chemicals:

Name of Personal Physician:

Telephone: Area Code ()

[illegible]

Project Supervisor:

Date Demobilized

Signature

Sevenson Environmental Services, Inc.

Health and Safety Site Inspection Form

Inspector: _____

Inspection Date: _____

Section 1: Project Description

Project Name: _____

Site Location: _____

Project Number: _____

Project Manager: _____

Consultant Name: _____

Superintendent: _____

Site Health and Safety Officer: _____

Operations:

<input type="checkbox"/> Industrial Operations	<input type="checkbox"/> Emergency Response
<input type="checkbox"/> Remedial Operations	<input type="checkbox"/> Excavation/Trenching/Shoring
<input type="checkbox"/> Dewatering Operations	<input type="checkbox"/> Confined Space Entry
<input type="checkbox"/> Drum Handling Operations	<input type="checkbox"/> Thermal Desorption Operations
<input type="checkbox"/> Drilling Operations	<input type="checkbox"/> Decontamination Operations
<input type="checkbox"/> Other: _____	

Section 2: General Site Setup/Support Zone

A. Site Setup

- | | | | |
|---|------------------------------|-----------------------------|------------------------------|
| 1. Are work zones clearly defined? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Are support trailers located to minimize exposure from a potential release? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are support trailers accessible for approach by emergency vehicles? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Is the site properly secured during and after work hours? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Are adequate communications (telephones, radios) available on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Is drinking water available? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Are adequate toilet facilities available on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 8. Are eating and food storage areas clean and maintained? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 9. Is there adequate lighting? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 10. Are Lock-Out/Tag-Out Kits available on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 11. Do affected site personnel have a 40 hour certificate? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 12. Do Managers and/or Supervisors have a certificate for the 8 hours of additional training? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 13. Have all site personnel received medical surveillance in the previous 12 months? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 14. Are disposal arrangements in place for spent PPE and decontamination wash waters? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 15. Is all of the emergency and first aid equipment that is identified in the HASP available on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

16. Does the HSO conduct daily safety inspections which are documented to identify safety hazards and unsafe conditions? ☐ YES ☐ NO ☐ N/A
17. Are accident/injury investigation forms available? ☐ YES ☐ NO ☐ N/A
18. Are all known safety hazards and unsafe conditions corrected? ☐ YES ☐ NO ☐ N/A

B. Health and Safety Plan

- | | | | | | | |
|--|--------------------------|-----|--------------------------|----|--------------------------|-----|
| 1. Is a HASP accessible to all employees? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 2. Has the HASP been briefed to employees on site? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 3. Are the MSDS's available for review by employees on site? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 4. Is there a designated HSO on site? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 5. Are employees aware and understand the results of exposure? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 6. Is the air monitoring plan in place? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 7. Are air monitoring devices properly used, calibrated and maintained? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 8. Are air monitoring results logged and available for review? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| 9. Does the HASP include the following: | | | | | | |
| • Site Characterization, description of existing conditions. | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Personnel training requirements. | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • A written PPE program describing the types and usage. | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Listing of PPE required for each site task. | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Is there a hazard/risk analysis for all site activities? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Are the frequency and types of air monitoring presented? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Are both personnel and equipment decontamination procedures presented? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Is an emergency response plan presented? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Are the medical surveillance requirements presented? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Has the nearest medical assistance been identified? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Is there a discussion of site control measures (i.e., fencing, security, work zones)? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Description of confined space entry procedures (if this work will occur). | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Has a spill containment program been included? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Are Health and Safety Operating Guidelines (HSOGs) available for all pertinent activities? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Are the programs and procedures presented in the HASP being followed? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |
| • Have site personnel received training with all HSOGs? | <input type="checkbox"/> | YES | <input type="checkbox"/> | NO | <input type="checkbox"/> | N/A |

C. Site Posters

1. Are the following documents posted in a prominent and accessible area?
- | | | | |
|---|------------------------------|-----------------------------|------------------------------|
| <input type="checkbox"/> Department of Labor 5 – 1 Poster | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| <input type="checkbox"/> OSHA 300 | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

D. Emergency Plans

- | | | | |
|---|------------------------------|-----------------------------|------------------------------|
| 1. Are emergency telephone numbers posted and verified? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Have emergency escape routes been designated? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are employees familiar with the emergency signals? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Is the hospital route posted? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Are employees familiar with emergency procedures? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

6. Is the inventory of emergency response equipment and supplies adequate? ☐ YES ☐ NO ☐ N/A

E. Medical and First Aid

1. Are First Aid Kits accessible and identified? ☐ YES ☐ NO ☐ N/A
2. Are emergency eye washes available and in proper working order? ☐ YES ☐ NO ☐ N/A
3. Are emergency showers available? ☐ YES ☐ NO ☐ N/A
4. Are the First Aid Kits large enough for the number of people on site? ☐ YES ☐ NO ☐ N/A
5. Are the First Aid Kits inspected after each use? ☐ YES ☐ NO ☐ N/A
6. Are there First Aid/CPR trained personnel available? ☐ YES ☐ NO ☐ N/A
7. Is a heat/cold stress monitoring program in place? ☐ YES ☐ NO ☐ N/A

F. Fire Protection

1. Has a fire alarm been established? ☐ YES ☐ NO ☐ N/A
2. Do employees know the location and use of all fire extinguishers on site? ☐ YES ☐ NO ☐ N/A
3. Are fire extinguishers marked and inspected monthly? ☐ YES ☐ NO ☐ N/A
4. Are combustible materials segregated from open flames? ☐ YES ☐ NO ☐ N/A

G. Fire Prevention

1. Has a smoking policy been established? ☐ YES ☐ NO ☐ N/A
2. Is smoking prohibited in flammable storage areas? ☐ YES ☐ NO ☐ N/A
3. Are fire lanes established and maintained? ☐ YES ☐ NO ☐ N/A
4. Are flammable dispensing systems grounded and bonded? ☐ YES ☐ NO ☐ N/A
5. Are proper receptacles (i.e., safety cans, cabinets) available for the storage of flammables? ☐ YES ☐ NO ☐ N/A
6. Are gasoline cans of the proper type (not plastic)? ☐ YES ☐ NO ☐ N/A
7. Has the local fire department been contacted? ☐ YES ☐ NO ☐ N/A
8. Is ground and bonding equipment available? ☐ YES ☐ NO ☐ N/A
9. Are fuel tanks properly contained with a dike? ☐ YES ☐ NO ☐ N/A
10. Is the dike capable of holding quantities being contained? ☐ YES ☐ NO ☐ N/A

Section 3: Work Areas/Contamination Reduction Zone/Exclusion Zone

H. Walking and Working Surfaces

1. Are accessways, stairways, ramps, and ladders clean of ice, mud, snow, or debris? ☐ YES ☐ NO ☐ N/A
2. Are ladders within maximum length requirements? ☐ YES ☐ NO ☐ N/A
3. Are ladders properly barricaded if used in passageways, doors, or driveways? ☐ YES ☐ NO ☐ N/A
4. Are broken or damaged ladders tagged and taken out of service? ☐ YES ☐ NO ☐ N/A
5. Are metal ladders prohibited in electrical service areas? ☐ YES ☐ NO ☐ N/A
6. Are stairways and floor openings guarded? ☐ YES ☐ NO ☐ N/A
7. Are safety feet installed on straight and extension ladders? ☐ YES ☐ NO ☐ N/A
8. Is general housekeeping up to our standards? ☐ YES ☐ NO ☐ N/A
9. Are fall protection devices available on site? ☐ YES ☐ NO ☐ N/A
10. Are fall protection devices properly used and maintained? ☐ YES ☐ NO ☐ N/A

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 11. Are ladders secured when in use? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 12. Is there a written Fall Protection Plan? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 13. Have employees received training in Fall Protection? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

I. Materials Handling

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 1. Are materials stacked and stored as to prevent sliding or collapsing? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Are flammables and combustibles stored in non-smoking areas? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Is machinery braced and lock-out/tag-out procedures in place? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are tripping hazards labeled? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Are riders prohibited on materials handling equipment? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Are OSHA approved manlifts provided for the lifting of personnel? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Are all containers labeled as to contents? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 8. Are flammable liquids stored in approved safety cans? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 9. Are hoses secured and in good condition? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 10. If powered industrial trucks or fork lifts including "off road" forklifts are used, have operators been certified? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

J. Hand and Power Tools

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 1. Are defective hand and power tools tagged and taken out of service? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Is eye protection available and used when operating power tools? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are guards and safety devices in place on power tools? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are hand and power tools inspected before each use? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Are spark-resistant tools available? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Are extension cords in good repair? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

K. Slings and Chains ☐ N/A

- | | | | |
|---|------------------------------|-----------------------------|------------------------------|
| 1. Are damaged slings, chains, and rigging tagged and taken out of service? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Are slings inspected before each use? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are slings padded or protected from sharp corners? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Do employees keep clear of suspended loads? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

L. Personal Protective Equipment (PPE)

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 1. Have levels of PPE been established? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Do all employees know their level of protection? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Have respirator wearers been fit tested in the past year? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are respirators used, decontaminated, inspected, and stored according to standard procedures? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Is defective PPE tagged? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Does compressed breathing air meet CGA Grade "D" minimum? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Are airlines monitored and protected? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 8. Are there sufficient quantities of safety equipment and repair parts? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 9. Is PPE and respiratory equipment properly used and maintained? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 10. Is hearing protection available for high noise? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 11. Is all PPE that has been used either disposed of or thoroughly cleaned prior to removal from any exclusion zone? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 12. Is there an adequate supply of PPE available? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 13. Are donning and doffing procedures identified? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 14. If SCBAs are on site, are they being inspected at least monthly? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

M. Electrical

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 1. Are warning signs exhibited on high voltage equipment (>250V)? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Is electrical equipment and wiring properly guarded? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are electrical lines, extension cords, and cables guarded and maintained in good condition? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are extension cords kept out of wet areas? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Is damaged electrical equipment tagged and taken out of service? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Have underground electrical lines and utilities been identified by proper authorities? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Are qualified electricians only allowed to work on electrical systems? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 8. Is lock-out/tag-out procedures in place when working with electrical systems? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 9. Are ground fault interrupter circuits used on all outdoor electrical hook-ups? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 10. Have the CFCIs been tested? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 11. Are there any open, exposed electrical panels on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

N. Compressed Gas Cylinders ☐ N/A

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 1. Are breathing air cylinders charged only to prescribed pressures? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Are like cylinders segregated in well ventilated areas? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Is smoking prohibited in cylinder storage areas? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are cylinders stored securely and upright? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Are cylinders protected from snow, rain, etc.? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Are cylinder caps in place before cylinders are moved? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Are fuel gas and O2 cylinders stored a minimum of 20 feet apart? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

O. Scaffolding ☐ N/A

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 1. Is scaffolding placed on a flat, firm surface? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Are scaffolding planks free of mud, ice, grease, etc.? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Is scaffolding inspected before each use? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are defective scaffolding parts taken out of service? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Does scaffold height exceed 4 times the width or base dimension? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Does scaffold planking overlap a minimum of 12 inches? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Does scaffold planking extend over end supports between 6 to 18 inches? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 8. Are employees restricted from working on scaffold during storms and high winds? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 9. Are all pins in place and wheels locked? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

P. Personnel Decontamination ☐ N/A

- | | | | |
|---|------------------------------|-----------------------------|------------------------------|
| 1. Are decontamination stations set-up on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 2. Is a contamination reduction zone set-up on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are waste receptacles available for contaminated PPE? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Are steps taken to contain liquids used for decon? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Have decontamination steps and procedures been covered by the HSO in site briefings? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Is all PPE and respiratory equipment cleaned daily? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

Q. Equipment Decontamination☐ N/A

1. Has an equipment decon been established?
2. Is contaminated wash water properly contained and disposed of?
3. Are all pieces of equipment inspected for proper decontamination before leaving site?
4. Are all pieces of equipment being cleaned per HASP?

<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A

R. Welding and Cutting☐ N/A

1. Are fire extinguishers present at welding operations?
2. Are confined spaces such as tanks, tested prior to welding?
3. Are Hot Work Permits available?
4. Are proper gloves, helmets, aprons available for welding?
5. Are welding machines properly grounded?
6. Are spare oxygen and gas cylinders stored a minimum of 20 feet apart when not in use?
7. Are only trained personnel permitted to operate welding and cutting equipment?
8. Are welding screens available for use?

<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A

S. Excavation, Trenching, and Shoring☐ N/A

1. Are employee protection systems in place to protect employees?
2. Are guardrails or fences placed around excavations near pedestrian or vehicle thoroughfares?
3. Are utilities located and marked?
4. Are ladders used in trenches over 4 feet deep?
5. Is material excavated placed a minimum of 2 feet from the excavation?
6. Is a competent person designated for the excavation?

<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A

T. Confined Spaces☐ N/A

1. Have employees been trained in the hazards of CS?
2. Are CS entry permits available on site?
3. Is a CS rescue team (on or off site) available?
4. Are CS entry procedures being followed?

<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A

Section 4: Equipment/Vehicles**U. Motor Vehicles**

1. Are vehicles inspected before each use?
2. Are persons licensed/certified for the equipment they operate?
3. Are unsafe vehicles tagged and reported to supervision?
4. Are vehicles shut down before fueling?
5. When backing vehicles, are spotters provided?
6. Is safety equipment on vehicles?
7. Are loads secure on vehicles?

<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A

V. Heavy Equipment

1. Is heavy equipment inspected before each use?

<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> N/A
------------------------------	-----------------------------	------------------------------

- | | | | |
|--|------------------------------|-----------------------------|------------------------------|
| 2. Is defective equipment tagged and taken out of service? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 3. Are project roads and structures inspected for load capacities and proper clearances? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 4. Is heavy equipment shut down for fueling and maintenance? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 5. Are back-up alarms installed and working on equipment? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 6. Have Operators been properly trained to operate the equipment they are using? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 7. Are riders prohibited on heavy equipment? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 8. Are guards and safety devices in place and used? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 9. Are barriers set up to prevent personnel from entering the area within the swing radius of track equipment? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 10. If not, are warning signs posted on both sides and the rear of track equipment warning employees to stay out of the swing radius and have site personnel been trained to stay out of the swing radius areas? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |
| 11. Are annual inspection reports for all cranes available on site? | <input type="checkbox"/> YES | <input type="checkbox"/> NO | <input type="checkbox"/> N/A |

Section 5: Comments and Recommendation (attach extra sheets if necessary)

Item No.

[illegible]

Sevenson Environmental Services, Inc.

Health and Safety Inspection Summary Form

Inspection Date: _____ Inspector: _____

Site: _____

Project Manager: _____

Health and Safety Officer:

Superintendent: _____

OPERATIONS REVIEWED:

Corrective Measures Required? ☐ Yes ☐ No

If Yes, please briefly describe issues and suggested corrective measure(s). See completed Site Inspection Form for details.

[illegible]

Date Prepared

Inspector Signature

Sevenson Environmental Services, Inc.
PERMIT FOR OPEN FLAME OR WELDING

I. Job description and equipment used:

II. Monitoring:

Date	Time	O ₂	LEL	Organic Vapor

III. Fire Protection

a. Fire extinguishers in place	(Initials)
b. Area clear of other combustible	(Initials)

IV. Operations in compliance with OSHA regulations (Initials)

Signature	Date
-----------	------

**Sevenson Environmental Services, Inc.
RESPIRATOR FIT TEST RECORD**

EMPLOYEE NAME:		DATE:	
RESPIRATOR MANUFACTURE:			
RESPIRATOR SIZE:			
RESULTS			
	Isoamyl Acetate	Irritant Smoke	Other
FIT			
NO FIT			
COMFORT:	Very Comfortable ____	Comfortable ____	Tolerable ____
	Uncomfortable ____	Very Uncomfortable ____	
COMMENTS:			
EMPLOYEE SIGNATURE:			

**Sevenson Environmental Services, Inc.
RESPIRATOR FIT TEST RECORD**

EMPLOYEE NAME:		DATE:	
RESPIRATOR MANUFACTURE:			
RESPIRATOR SIZE:			
RESULTS			
	Isoamyl Acetate	Irritant Smoke	Other
FIT			
NO FIT			
COMFORT:	Very Comfortable ____	Comfortable ____	Tolerable ____
	Uncomfortable ____	Very Uncomfortable ____	
COMMENTS:			
EMPLOYEE SIGNATURE:			